

PSYCHOSOCIAL PROFILES: SERIOUS AND CHRONIC FEMALE JUVENILE
OFFENDERS WITH AND WITHOUT A SUBSTANCE USE DISORDER

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ABSTRACT

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Psychosocial Profiles: Serious and Chronic Female Juvenile Offenders With and Without a Substance use Disorder

(Under the direction of Amelia C. Roberts, Ph.D.)

This dissertation examined the psychosocial profiles and prevalence of substance use and other mental health disorders in a sample of 203 incarcerated female juvenile offenders. The sample comprised all girls incarcerated in North Carolina over a 4 ½-year period. The psychosocial profiles of female juvenile offenders with and without a substance use disorder were compared, and latent profile analysis was conducted to determine if there were distinct psychosocial risk profiles in the state-based sample. Nearly 70% of the sample met criteria for an alcohol- or substance-related disorder. Conduct disorders were the most prevalent *DSM-IV-TR* diagnoses, followed by substance-related disorders and mood disorders. Serious female juvenile offenders with and without a substance use disorder differed in terms of their psychosocial risk profiles; female juvenile offenders with a substance use disorder had higher levels of problem severity. They were more likely to have problems related to alcohol use, drug use and cognition. Latent-class analysis revealed that there were four distinct groups (Aggression Only, Alcohol and Drug Use, Severe Alcohol and Drug Use, and Family Conflict) in the sample, with varying levels of problem severity related to family, peer, and school processes. Implications for adaptive and targeted interventions are discussed.

DEDICATION

I dedicate this dissertation to my beloved, departed grandmother, Eva Welch. Her consummate love, devotion, and commitment to her family left an indelible mark on our lives. Memories of her words, strength, and encouragement provided comfort and guidance through this life-changing journey. There were many days when the journey was wrought with such seemingly insurmountable challenges that I wanted to veer off path and take a detour, but the memories of her belief in me and her aspirations for me gave me the fortitude and will to continue this journey to completion. Grandma, thanks for being my autopilot and my compass.

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CHAPTER 1

INTRODUCTION

Substance abuse and serious delinquency are two of the most costly social problems facing our nation. These behaviors often co-occur; they exact heavy tolls on individuals, families, and social systems; and they impose a tremendous economic burden on society. For the individual, serious delinquency and the abuse of psychoactive substances¹ contribute to developmental lags, truancy, poor academic performance, psychosocial dysfunction, and health-related problems. Drug abuse and delinquency also may hinder interpersonal relations, impair identity development, and impede the acquisition of skills and experiences necessary for mastering adult roles (Essau, 2002; Winters, Latimer, & Stinchfield, 2001). Substance abuse, in particular, contributes to the loss of cognitive and motor capabilities (National Institute of Drug Abuse [NIDA], 2000). In addition, substance abuse and delinquency are associated with risky sexual behavior (Huizinga, Loeber, & Thornberry, 1994), emotional and psychological distress (Dembo, Pacheco, Schmeidler, Fisher, & Cooper, 1997), HIV infection (McClelland, Teplin, Abram, & Jacobs, 2002), and suicide attempts (Essau, 2002). Within families, these problems contribute to strained relationships and crises, disrupt the family socialization process, and exhaust family members both emotionally and financially (Inciardi,

¹ Psychoactive substances are chemicals or compounds that have addictive properties and alter brain function, resulting in temporary changes in perception, cognition, mood, consciousness or behavior (McNeece & DiNitto, 2005).

Horowitz, & Pottieger, 1993). Within other social systems (e.g., the community, school, peers), substance abuse and serious delinquency contribute to loss of productivity, neighborhood and social disorganization, increased school problems, and poor peer relationships (Guthrie & Low, 2001).

Furthermore, the economic costs to society are enormous. Costs associated with substance abuse include medical and substance abuse treatment, productivity and property losses, and expenses related to crime and delinquency. In 2001, costs related to substance abuse in the United States were estimated at more than \$414 billion (Schneider Institute for Health Policy, 2001). Likewise, serious and chronic delinquency generate substantial costs for society. For example, between 1997 and 2001, victim-related costs associated with a single chronic juvenile offender were estimated at \$62,000 to \$250,000 (U.S. Department of Justice [DOJ], 2002). The additional expenses incurred by the juvenile and criminal justice system for the same chronic juvenile offender were estimated at \$21,000 to \$84,000 over the course of the 4-year period. Finally, costs associated with a single juvenile who abuses psychoactive substances were estimated at \$150,000 to \$360,000 over the course of the 4-year period.

Substance Abuse and the Juvenile Justice System

An estimated 1.9 million juvenile offenders have substance abuse or addiction problems; over 44% have a *DSM-IV-TR* diagnosis of substance abuse or substance dependence (Center on Addiction & Substance Abuse [CASA], 2004). Substance and alcohol abuse have been implicated in more than 69% of juvenile violent arrests, 72% of juvenile property offenses, and more than 81% of other offenses, such as assault, vandalism, and disorderly conduct. Moreover, substance abuse and substance-related

crimes have contributed substantially to increases in juvenile justice caseloads. There was an increase of nearly 30% in the number of arrests of juveniles for substance abuse violations between 1994 and 2003 (DOJ, 2004). During this period, there was a 60.5% increase in juvenile arrests for drug violations involving marijuana, a 163% increase in arrests for synthetic narcotics—the highest proportional increase—and a 38.4% increase in dangerous nonnarcotics. In contrast, juvenile arrests for drug violations involving opium or cocaine declined by 50.9% in the same period.

Moreover, research has shown that the more serious a youth's involvement in substance use, the more serious his or her involvement in delinquency, and vice versa (Huizinga, Loeber, & Thornberry, 1994). This finding is consistent across gender, age, and race. In addition, sustained involvement with drugs or alcohol increases the likelihood of arrest and continued contacts with the juvenile justice system, and continued contacts increase the likelihood of being committed to juvenile correctional facilities (CASA, 2004).

Gender Differences in Rates of Arrests

Juvenile justice arrest data indicate a substantial upsurge in rates of arrest for drug abuse violations and other delinquent acts among girls, particularly for serious acts of delinquency. For example, arrests of boys for drug abuse violations increased by 13% between 1994 and 2003, whereas arrests of girls increased by 56% during that same period (Snyder, 2005). Moreover, between 1980 and 2003, the increase in the arrest rates of female juveniles was greater than the increase in the arrest rates of male juveniles for aggravated assault (96% compared to 13%), simple assault (269% compared to 102%), and weapons law violations (147% compared to 18%) (Snyder, 2005). Because serious

substance use has been found to be associated with serious delinquency (Huizinga, Loeber, & Thornberry, 1994) and violent offending among girls (Holsinger & Holsinger, 2005), these statistics indicate a greater need to understand the co-occurring behaviors of serious substance use and serious delinquency in this population.

Purpose of Study

One of the goals of this study is to review the research on the co-occurring behaviors of serious substance use and serious delinquency among girls. Understanding what is and what is not known about these co-occurring problems is vital for guiding the development of interventions. A second goal of this study is to address the following research questions:

1. What is the extent of substance use disorders and of co-occurring substance use and mental health disorders in a sample of female juvenile offenders?
2. Do the psychosocial profiles of female juvenile offenders with and without a substance use disorder differ, as measured by the Multidimensional Adolescent Assessment Scale?
3. Are there distinct psychosocial risk profiles in a sample of female juvenile offenders? If so, do the subgroups of female juvenile offenders with distinct psychosocial risk profiles differ as a function of the demographic characteristic of race and the background characteristic of a *DSM-IV-TR* diagnosis of an alcohol-or substance use disorder?

Defining Serious Substance Use and Delinquency

Given the number of concepts used in this study, clear definitions of the major concepts are critical. *Serious substance use* is defined as frequent or regular use of psychoactive substances, accompanied by adverse consequences. Other terms used in the

present study to refer to maladaptive substance use include *substance abuse* and *substance use disorders*. The more traditional definition of substance abuse found in the *DSM-IV-TR* (2000) is used in the current study. The *DSM-IV-TR* definition of substance abuse, is “a maladaptive pattern of substance use leading to clinically significant impairment or distress as manifested by one (or more) of the substance abuse criteria, occurring within a 12-month period” (American Psychological Association, 2000, ¶ 1). Criteria for a diagnosis of substance abuse include a failure to fulfill major role obligations; recurrent substance-related legal, social, or interpersonal problems; and recurrent use associated with physically hazardous situations. Substance use disorders are a subgroup of substance-related disorders in which psychoactive substance use or abuse repeatedly results in significantly adverse consequences.

Serious delinquency is defined as the commission of violent crimes, such as murder and nonnegligent manslaughter, forcible rape, robbery, and aggravated assault, or of property crimes, such as burglary, larceny, motor vehicle theft, and arson.

Chronic delinquency refers to the commission of three or more offenses of any type, including status offenses (i.e., acts or behaviors that are illegal for people under the age of 18 simply by virtue of age).

The Importance of Understanding the Substance Abuse-Delinquency Nexus among Girls

Given the adverse effects of substance abuse and serious delinquency on the social environment, and the economic drain on the juvenile justice, criminal justice, health-care, and social service systems, it is important to understand these problems—respectively and concomitantly—and to develop effective social and public health prevention and intervention strategies to reduce and alleviate them. Although there has

been progress in understanding substance abuse and its relationship to delinquency, little consideration has been given to understanding the substance use/abuse–delinquency relationship in populations of females. If the ultimate goal of research is to develop effective strategies, interventions, and social policies, then understanding the co-occurring problems of substance abuse and delinquency across genders is critical.

In addition, social workers and others in the helping professions cannot develop a meaningful understanding of the personal and social contexts of substance abuse and delinquency or develop effective prevention and intervention strategies without first grappling with the complex nature of gender. Gender-sensitive knowledge and skills will be required if social workers and others in the helping professions are to avert the co-occurring behaviors of substance abuse and serious delinquency among adolescents.

Most of what we know about the co-occurring problems of substance use/abuse is based on studies using samples that were predominantly male; this bias limits the generalizability of findings to female population groups. Despite a growing body of research on the link between substance abuse and crime among adult females, little is known about this relationship among adolescent females. Findings based on adult females cannot be readily extrapolated to adolescent female populations because of the developmental, cognitive, and physiological differences between adults and adolescents.

Understanding the substance abuse–delinquency nexus in the adolescent female population is important. Arrest data show that an increasing proportion of the juvenile justice population is female, and a substantial proportion of arrests are for substance-related crimes. In 2003, females under 18 comprised 29% (or 643,000) of all juvenile arrests (Snyder, 2005). Females accounted for 16% of juvenile arrests for drug abuse

violations, 23% of arrests for drunkenness, 35% of arrests for liquor law violations, and 20% of arrests for driving under the influence. Among other offenses, females accounted for 24% of juvenile arrests for aggravated assault, which was the most common violent crime index offense committed by girls, and 32% of juvenile arrests for simple assault.

Statistical trends also show an increase in the percentage of arrests for drug abuse violations among two age groups of girls: girls under the age of 10, and girls under the age of 15. In 1994, 17% of arrests for drug abuse violations involved girls under the age of 10; by 2003, the percentage had increased to 21% (DOJ, 2004). This increase is of concern because of evidence indicating that preadolescent delinquency and substance use are associated with a variety of adverse outcomes, including persistent delinquency, adult criminality, and substance abuse (Lewis et al., 1991; Zocolilo & Rogers, 1991).

Girls arrested for substance-related crimes, particularly drug possession and drug selling, have a higher rate of positive drug screens than do girls arrested for other types of delinquent acts (National Institute of Justice, 2003). A direct connection has been found between the regular use of psychoactive substances and drug selling (Chaiken & Chaiken, 1990).

The regular use of psychoactive substances also is related to other acts of delinquency. Many female juvenile offenders commit illegal acts (e.g., shoplifting, theft, or prostitution) to fund their substance use (Senna & Siegel, 2001). One study conducted with a sample of female juvenile offenders found that 50% of the sample reported that the use of psychoactive substances prior to the commission of a crime led to their incarceration (Fejes-Mendoza & Miller, 1995). Kataoka et al. (2001) and Walrath et al. (2003) found that having a history of prior incarceration or prior conviction is associated

with substance use problems among female juvenile offenders. Other studies conducted with samples of incarcerated girls demonstrate that alcohol and substance use are related to violence and/or violent offending (Holsinger & Holsinger, 2005). Prinz and Kerns (2003) found that incarcerated female juvenile offenders who initiated any type of substance use at age 12 or earlier had a higher likelihood of being arrested for substance-related and violent offenses.

The Need to Study Incarcerated Female Juvenile Offenders

In light of the tendency of delinquent behavior and substance abuse to co-occur, it is not surprising that substance use disorders are prevalent among populations of incarcerated girls. Chesney-Lind (2001) and Prescott (1997) cite rates of substance use disorders ranging from 60% to 87% in samples of incarcerated girls. The rate of substance use disorders is also moderately high in samples of detained girls. Findings of an epidemiological study, based on a large random sample conducted by Teplin et al. (2002), illustrated that 47% of the 657 female adolescents in a detention center had a diagnosis of a substance abuse disorder.

These prevalence rates are substantially higher than the rate of 22% found in a sample of girls on juvenile probation (Wasserman, McReynolds, Ko, Katz, & Carpenter, 2005). However, the relatively low prevalence of substance use disorders in a justice-involved sample could be attributed to geographic differences, the time frame of assessment, and/or the seriousness of the delinquent activity (Wasserman et al., 2005). Moreover, the substantial difference between samples of detained or incarcerated girls and the sample of girls on probation may be attributed to qualitative difference between the groups. That is, the samples of detained or incarcerated girls may have represented an

extreme group in terms of psychopathology (McCabe, Lansing, Garland, & Hough, 2002).

Findings of a 2003 national study conducted by the Substance Use and Mental Health Service Administration [SAMHSA] (2004) revealed that of the 4.2% of girls in the general population who had been in jail or a detention center in 2002, 44% reported previous-year illicit substance use. The findings also showed that girls who had been in a jail or a detention center were more likely than their nondetained female counterparts to have a previous-year diagnosis of alcohol or substance abuse/dependence. Furthermore, longitudinal studies have shown that between 40% and 70% of girls with a history of conduct disorder or delinquency developed substance abuse problems as women (Lewis et al., 1991; Storm-Mathisen & Vaglum, 1994; Zocolilo & Rogers, 1991).

On the basis of these findings, it seems that incarcerated girls make up a subgroup that is at particularly high risk of developing substance use problems in adulthood.

Findings of another longitudinal study revealed that women with a history of juvenile incarceration faced more problems in adulthood because of substance and alcohol use (Lanctôt, Cernkovich, & Giordano, 2006). Moreover, women with a history of juvenile incarceration were involved in more criminal activities than were their counterparts without a history of juvenile incarceration.

Because substance use disorders and histories of serious and chronic delinquency are common among populations of girls involved in the juvenile justice system, particularly incarcerated girls, using specialized samples made up of girls from an incarcerated population would advance knowledge on the co-occurring problems of serious substance use and delinquency and would inform the design of interventions for

serious female juvenile offenders. Although the base rates of serious and chronic offending among girls are relatively low compared to the rates among boys, the consequences are no less serious. Like their male counterparts, this small subgroup of female juvenile offenders contributes disproportionately to juvenile acts of delinquency, and eventually to adult crime, posing serious challenges for the juvenile justice system. Kempf-Leonard, Tracey, and Howell (2001) found that only 3.5% of the girls in their sample were serious and chronic offenders, but 44% of this group had arrest records as adults.

The challenge that serious and chronic offenders pose for the juvenile and criminal justice systems is further compounded by the lack of treatment interventions for this population. Interventions for female juvenile offenders have not been developed at the same rate as interventions for male juvenile offenders (Dixon, Howling, & Starling, 2004). Although female and male juvenile offenders share some of the same treatment needs, the manifestations and severity of those needs differ, particularly as they relate to mental health and trauma issues. For instance, incarcerated adolescent females have higher rates of mental health problems than do their male counterparts (Kataoka et al., 2001; McCabe et al., 2002; Timmons-Mitchell et al., 1997). They exhibit higher levels of depression, anxiety (Goldstein et al., 2003; Kataoka et al., 2001), posttraumatic stress disorder (Cauffman, Feldman, Waterman, & Steiner, 1998; Royce-Baerger, Lyons, Quigley, & Griffin, 2001), abuse history (McCabe et al., 2002; Royce-Baerger et al., 2001; Walrath et al., 2003), and suicidal ideation (Goldstein et al., 2003; Royce-Baerger et al., 2001).

Comparative studies of substance misuse among incarcerated juvenile female and male offenders have been inconclusive. For example, Timmons-Mitchell et al. (1997) found that female juvenile offenders had significantly higher elevated scores on the Substance Abuse Proneness scale than did male offenders, whereas Teplin et al. (2002) found higher prevalence rates of substance use disorders among males. One study found similar rates of substance use disorders among both justice-involved boys and justice-involved girls (Wasserman et al., 2005); another study found that females were more likely than their male counterparts to endorse indicators of severe or chronic drug use, although boys were more likely to engage in frequent drug use (Kim & Fendrich, 2002). On balance, these findings suggest that a slightly different treatment approach may be needed for the two populations. Interventions for incarcerated girls may need to focus on internalizing as well as externalizing disorders.

The aforementioned studies provide broad descriptive information about differences and similarities in psychosocial factors related to substance use, substance abuse, and delinquency across genders. However, these types of between-group studies have very seldom been designed to capture the variability and heterogeneity that may exist in populations of incarcerated girls. As a result, female juvenile offenders have been treated as a homogeneous group, limiting our understanding of the distinctive and multiple pathways that contribute to their involvement in serious substance use and delinquency.

The “average” female juvenile offender has often been described as

- 1 being 14 to 15 years old;
- 2 being poor and growing up in a neighborhood with a high crime rate;

- 3 belonging to an ethnic/racial minority group;
- 4 having a history of poor academic performance;
- 5 having a history of being physically, sexually, and/or emotionally
victimized; and
- 6 using and abusing psychoactive substances (Greene & Associates, 1998).

This profile provides a necessary, but simplistic, portrayal of female juvenile offenders. Such portrayals of the so-called average female juvenile offender do not identify the characteristics or profiles of particular groups of female juvenile offenders, nor the subgroups of female juvenile offenders who have similar needs. For example, given that serious substance use is the problem that co-occurs most frequently with serious delinquency (Biglan et al., 2004; Huizinga et al., 1994), we don't know whether the profiles of serious female offenders with a substance use disorder differ from those without a substance use disorder.

On the basis of extant research, conducted primarily with male samples, we know that juvenile offenders with a substance use disorder have higher levels of violent offending and comorbid psychopathology than do their counterparts without a substance use disorder (Haapsalo & Hamalainen, 1996; Milin, Halikas, Meller, & Morse, 1991). They are more likely to display higher levels of psychological problems, dominance, and lack of control, as well as lower levels of emotional stability (Mailloux, Forth, & Kroner, 1997). Given that similar factors appear to promote delinquency and substance abuse among both male and female adolescents (Lanctot & LeBlanc, 2002), one could surmise that serious female juvenile offenders with substance use problems may be qualitatively different from their female counterparts without substance use problems.

Understanding differences and similarities between those with and those without a substance use disorder is critically important for determining the treatment needs of each group. Also, less is known about the variation in psychosocial profiles and psychosocial needs of serious female offenders exhibiting or presenting the same needs. Having this knowledge is important because within-group differences along such dimensions as anxiety, intelligence, and self-esteem often exist in serious offenders with the same criminogenic needs (e.g., substance abuse treatment) (Bonta, 1996). Bonta further contends that these factors affect how well the individual responds to the style and mode of therapy and necessitate a matching of individual characteristics with treatment.

Because female juvenile offenders, whether with or without a substance use disorder, often possess a mental health disorder (Prescott, 1997; Timmons-Mitchell et al., 1997), understanding the epidemiology of substance use, mental health, and comorbid substance use disorders in this population also is important to focusing interventions. In addition to mental health disorders, female juvenile offenders often have other, interrelated problems, such as academic difficulty, family conflict, and trauma (McCabe et al., 2002; Royce-Baerger et al., 2001). All these factors must be considered when addressing their needs. Accordingly, a “careful identification of the configuration of problems facing youths is needed” (Huizinga, Loeber, Thornberry, & Cothorn, 2000, p. 6). By identifying and addressing the needs of incarcerated girls exhibiting the same constellation of psychosocial problems, interventions could be customized to subgroups of incarcerated girls, “rather than proceeding under the assumption that all offenders require similar treatment” (Huizinga et al., 2000, p. 1). And understanding the variation

between and within different subgroups of serious female offenders could lead to improvements in intervention and treatment.

Because there are few empirically based guidelines for the development of effective treatment-based interventions for populations of serious female juvenile offenders (Rowe, Liddle, Greenbaum, & Henderson, 2004), it would be “advantageous for agencies and treatment professionals to identify before treatment those girls who might benefit most from specific treatment components” (Smith, 2004, p. 38). Typologies and profile-based research could provide a critical first step in aiding practitioners in identifying similarities and differences among female juvenile offenders, could provide practitioners with diagnostic indicators (Adlaf & Zdanowicz, 1999), and could aid them in the development of tailored screening, assessment, and treatment interventions for different subgroups of female juvenile offenders. In addition, typologies and profile-based research could aid in the creation of a classification scheme for determining which combinations of interventions and treatment strategies work best for subgroups of girls with particular constellations of problems. Finally, profile-based research may hold promise for aiding in formulation of theory regarding the substance use/abuse–delinquency nexus among females.

In short, epidemiological insights combined with profile-based research can inform interventions and treatment approaches for serious female juvenile offenders. Thus, the major goal of the present study is to inform the design of interventions and treatment strategies for subgroups of incarcerated female juvenile offenders with a history of serious and chronic delinquency.

Significance of the Study

The present study fills a gap in the literature on serious and chronic female juvenile offenders. In the present study, incarcerated girls with histories of serious delinquency are studied on their own terms rather than in terms of their similarity or dissimilarity to their male counterparts. The within-group design of the present study allows for the examination of within-group heterogeneity in a sample of incarcerated girls. Understanding the heterogeneity that exists in this population is essential because different psychosocial factors are associated with different trajectories (Baer, MacLean, & Marlatt, 1998). To date, no studies have examined the variation in psychosocial profiles between incarcerated female juvenile offenders with and those without a substance use disorder, and relatively few studies have examined the constellation of needs and psychosocial risk profiles of different subgroups of incarcerated female juvenile offenders.

Another contribution of the present study is the use of a combination of person-centered and variable-centered analytic techniques. Much of the previous research conducted in this area has been based on variable-centered analytic techniques in which the focus was on the relationship between variables or an examination of mean differences between and among groups, thus concentrating on interindividual differences. These types of techniques, however, are less useful for examining subgroups of female juvenile offenders who may differ qualitatively from each other. The present study extends the research on profiles of incarcerated girls by using person-centered analytic techniques. Person-centered analytic techniques are oriented toward identifying patterns of similarity and dissimilarity among individuals (Bergman, 2001).

Organization

This dissertation is organized as follows: In chapter 2, I review previous research on the relationship between the behaviors of substance use/abuse and delinquency, focusing on the link between substance use/abuse and delinquency, the etiological nature of the substance abuse–delinquency relationship, and the interventions designed to address the co-occurring behaviors. In chapter 3, I review the biopsychosocial model of antisocial development/conduct disorder, which is the theoretical framework that serves as the structure of the present study. The methodology of the study, including procedures, instruments, measures, and statistical analyses, is presented in chapter 4. Results of the study are reported in chapter 5. Finally, in chapter 6, I discuss the findings and the implications for practice and future research.

CHAPTER 2

SUBSTANCE ABUSE AND DELINQUENCY AMONG GIRLS

The study of the substance abuse–delinquency nexus among girls is in its infancy. Consequently, research on these co-occurring problems in populations of girls is scattered, sparse, and fragmented. This echoes the view initially expressed by Tonry (1990) regarding the broader body of research on the substance abuse–crime nexus. Tonry asserted that “the literature is scant, much of it is fragmented, and too much of the research is poor in quality and weak in design” (p. 2).

Since 1990, however, the broader body of research on the substance abuse–delinquency/crime nexus has evolved, the literature has become more extensive, and the methodology has become more sophisticated. Given these advances, and because of the limited amount of research specifically examining the relationship between substance use/abuse and delinquency among girls, the broader research serves as a frame of reference for research on the substance abuse–delinquency nexus among girls. I draw from the broader research on the co-occurring behaviors of serious substance use and delinquency to frame the following review.

One must interpret the review within the context of the methodological challenges that beset research on the substance abuse–delinquency nexus. The maturation of knowledge in this area has been hampered by many of the same problems that impede the broader field of social science. These include incomplete explanatory models, inadequate

and poor measures of substance use and delinquency (Le Blanc, 2005), inattention to variation by type of delinquent acts and level of substance use, poor links between theory and data, deficient methods of defining key concepts, failure to specify functional relationships between sets of variables, and lack of uniformity and standardization of concepts and definitions (Rutter, Giller, & Hagell, 1998).

This chapter is divided into three sections. In the first section, I present research that establishes the link between substance use/abuse and delinquency in samples of girls. In the second section, I review research that examines the etiological nature of the substance use/abuse–delinquency relationship. In the final section, I review interventions designed to address the co-occurring problems of substance abuse and delinquency.

The Link Between Substance Use/Abuse and Delinquency

Data from the Office of Juvenile Justice and Delinquency Prevention, national survey studies, and survey studies of incarcerated, clinical, and school-based youths have established the extent, scope, and interrelationship of substance abuse and delinquency among girls.

Substance Use, Substance Abuse, and Delinquency in the General Population of Girls

Based on the SAMHSA (2003) National Survey on Drug Use and Health, the prevalence rate of current illicit drug use (i.e., use within the previous 30 days) among females age 12 to 17 was 11%. The prevalence rate was estimated at 7% for marijuana use, 4% for nonmedical use of prescription-type psychotherapeutics, 18% for alcohol consumption, and 13% for cigarette smoking. Moreover, in 2003, the estimated rate of substance dependence or substance abuse among females age 12 to 17 was 9%.

Results of the survey also revealed that previous-year substance use was the most prevalent delinquent behavior among girls age 12 to 17 in 2003 (SAMHSA, 2004). Close to 37% of girls (4.5 million) reported using alcohol in the previous year; 22% (2.7 million) reported using an illicit drug (e.g., marijuana, crack/cocaine, inhalants, hallucinogens, heroin, or prescription-type drugs); 20% (2.5 million) reported using cigarettes; 8% reported using nonmedical pain relievers; and 5% reported inhalant use.

The second most prevalent delinquent behavior was participating in one or more serious fights at school or work. Twenty percent reported participating in a fight, a significant increase over the 16% reported in 2002. Other delinquent behaviors included group-on-group fights (17%), attacking someone with the intent to hurt (6%), stealing something worth more than \$50 (3%), selling drugs (2%), and carrying a handgun (1%) (SAMHSA, 2004).

The prevalence of fighting was highest among African American and Latina girls, and African American girls had a significantly higher prevalence of attacking someone with the intent to hurt (11.3%) than did Latina (6.8%), White (4.9%), or Asian girls (3.8%). Asian girls had the highest prevalence of stealing something worth more than \$50 (3.9%). White girls had the highest prevalence of selling drugs (2.3%). Carrying a gun, although relatively rare, was most common among Asian (2.1%) and Latina girls (2.1%) (SAMHSA, 2004).

Substance Use and Abuse Among Girls in the Juvenile Justice System

National data on juvenile arrests indicate that in 2003, females accounted for 16% of juvenile arrests for drug abuse violations, 23% of arrests for drunkenness, 35% of arrests for liquor law violations, and 20% of arrests for driving under the influence

(Snyder, 2005). Moreover, data from official arrest statistics illustrate a continuous upsurge in rates of alcohol and drug arrests among females under the age of 18. Between 1980 and 2003, female juvenile arrests for drug abuse violations increased by 51% (Snyder, 2005).

Findings of prevalence and epidemiological studies demonstrate moderate to high rates of substance use disorders among detained and incarcerated female juvenile offender populations. Estimates of the prevalence rate of substance use disorders range from 47% (Teplin et al., 2002) to 85% (Dixon et al., 2004). For example, Teplin et al. (2002) found that 47% of the 657 female adolescents in a detention center had a substance abuse disorder. Of those diagnosed with a substance use disorder, 27% had an alcohol use disorder, 41% had a marijuana use disorder, 21% had both alcohol and other substance use disorders, and 7% had “other” substance use disorders. Conversely, the findings of one study conducted with a sample of girls on juvenile probation revealed a prevalence of 22% (Wasserman et al., 2005). This rate is substantially lower than the prevalence rates found in samples of detained and incarcerated girls.

Delinquency Among Girls Who Misuse and Abuse Psychoactive Substances

The extent of substance misuse and abuse has been well documented in samples of justice-involved girls. However, the extent of delinquent behaviors among populations of substance-abusing girls has not been documented to the same extent. In a national sample of adolescents seeking treatment for a substance use disorder, 32% of girls reported having a history of incarceration, probation, parole, or having a pending case during the year prior to substance abuse treatment (Rounds-Bryant, Kristiansen, Fairbank, & Hubbard, 1998). Forty percent of girls in the sample had been arrested at

some point in their lives. In addition, in the year prior to substance abuse treatment, 57% reported that they had committed aggravated assault or robbery and 41% reported engaging in illegal activity for the purposes of purchasing psychoactive substances.

Conversely, the rate of serious delinquency in a sample of substance using girls living in high-risk neighborhoods was substantially lower than the rates found in the Rounds-Bryant et al. (1998) study. Twenty percent of the girls characterized as serious substance users were also serious delinquents (Huizinga et al., 2000). On the other hand, slightly less than half of the females characterized as serious delinquents were also serious substance users. Among this sample of girls, delinquency was a stronger indicator of substance use than substance use was an indicator of serious delinquency.

Establishing the Link Between Substance Abuse and Delinquency Among Girls

A link between substance abuse and delinquency has been posited because of high levels of substance use and substance abuse among samples of youths involved in the juvenile justice system, and because of the high levels of involvement in delinquent activities among youths who use or abuse psychoactive substances. Using the data from the previously cited survey studies (Dixon et al., 2004; Teplin et al., 2002; Wasserman et al., 2005), and comparing these data with the rates of substance use/abuse among girls in the general population, it is possible to determine whether the rates of substance use/abuse among girls involved in the juvenile justice system are noteworthy. Although there were inconsistencies in how substance abuse was defined across studies, making it difficult to draw firm conclusions about rates of substance abuse and delinquency, the rate of substance abuse in the general population of girls (9%) (SAMHSA, 2004) was

substantially lower than the lowest prevalence among girls involved in the juvenile justice system (22%) (Wasserman et al., 2005).

One way to establish the link between substance use/abuse and delinquency is to demonstrate that the prevalence of substance use/abuse is substantially higher among girls involved in delinquency than among girls who are not involved, and/or to compare samples of girls involved with the justice system with samples of girls not involved with the justice system. Findings of studies comparing female juvenile offenders and female juvenile nonoffenders indicate a significantly higher prevalence of substance use disorders among offenders than among nonoffenders. For example, findings from Dixon et al.'s (2004) study, which was conducted with 100 female juvenile offenders and a matched comparison group of 100 nonoffending females, indicated a higher prevalence of substance use disorders among the female juvenile offenders (85%) than among the comparison group (5%).

Another way to establish the link between substance use/abuse and delinquency is to assess the strength of association between the two phenomena. Many researchers use the statistical techniques of correlation and regression analyses, and chi-square tests. Correlational research by Holsinger and Holsinger (2005) supports a significant (.340), although weak, association between drug and alcohol use and delinquency among their total sample of incarcerated girls. Although the association did not appear to differ between African American (.277) and White girls (.281), the findings revealed that alcohol/substance use was a significant, although weak, correlate of delinquency for both groups. Huizinga et al. (2000) found a significant, albeit moderate, association between substance use and serious delinquency.

In light of this research demonstrating weak to moderate, although significant, associations between substance use and delinquency among girls, one can surmise that there may be other plausible or alternative explanations to account for the relationship. The strength of the association between substance use and delinquency is also contingent upon a number of factors: the type and severity of the delinquency, the types of psychoactive substances used, and the frequency and duration of use.

The research outlined here establishes a link between substance use/abuse and other forms of delinquency among girls. The cited body of research, however, does not explain the etiological nature of the relationship, including such issues as temporal order, causality, interaction, and mediating or moderating factors. The next section discusses the etiological nature of the relationship.

The Etiological Nature of the Substance Use–Delinquency Nexus

Temporal Ordering

One of the initial steps in this line of inquiry has been to establish the temporal order between substance use/abuse and delinquency. Most of the relevant research conducted with broader samples of adolescents supports the hypothesis that delinquency precedes the use of psychoactive substances. This may not be true for adolescent females, because there is equal support in the literature for delinquency preceding substance use, substance use preceding delinquency, and both behaviors occurring simultaneously. Baskin and Sommers's (1998) study of 170 women offenders with histories of violent crime revealed that among the 60% of women in their sample who initiated violent offending during their adolescent years, violent offending preceded their drug use, whereas Brook, Whiteman, and Finch's (1995) study found substance use preceding

delinquency. Other studies have found that both behaviors were initiated concurrently (Inciardi et al., 1993). The temporal order of substance use/abuse and delinquency thus remains equivocal in populations of girls.

The Relation Between Substance Use/Abuse and Delinquency

Longitudinal research indicates that substance use has a substantial influence on delinquency among adolescent females. Huizinga et al. (2000) found that among a group of high-risk and non-high-risk girls, prior changes in substance use had a larger influence on subsequent changes in delinquency than the reverse. This finding could relate to evidence indicating that many adolescents mature out of delinquency but that drug use usually remains stable into young adulthood (Dembo et al., 1991; Elliott, Huizinga, & Ageton, 1985).

Kandel, Simcha-Fagan, and Davies's (1986) study, however, provides support for the view that substance use has a greater influence on subsequent delinquent behavior among girls. They found that delinquency in adolescence did not predict delinquency in adulthood but that illicit drug use did predict delinquency in adulthood. Likewise, Brook, Whiteman, Finch, and Cohen (1996) found that substance use had a significant total effect on delinquency but that the total effect of delinquency on substance use was not significant. Finally, a national longitudinal study conducted with a general population of girls demonstrated that prior delinquency directly influenced subsequent delinquency and substance use (Elliott et al., 1985).

Studies based on qualitative approaches, such as the autobiographical-account and life-history methods, reveal that the sequence of substance use and delinquency can take different forms. Baskin and Sommers (1998) found that among girls who initiated violent

offending in early adolescence, which the authors defined as age 11 to 15, substance abuse did not cause the onset of violent offending, and that violent and other types of offending preceded the onset of substance use by 2 years. For early-onset girls, peers played an indirect role in their substance use and offending by reinforcing behaviors that were already established in interaction with family members (usually siblings or cousins).

Many of the early-onset girls had engaged in violent offending almost 2 years before engaging in substance use, and their substance use appeared to be associated with being enmeshed in a “street life” that expanded their opportunities to become involved with the drug market as users and sellers. Among these girls, substance use remained an ancillary component of a generally violent lifestyle. Once they became addicted to psychoactive substances, however, such substances aggravated their involvement in violent offending. On the other hand, among the later-onset girls (age 15 and over), violent behavior increased over the course of their addiction. For the majority of the girls in this group, substance use preceded offending, or the behaviors were concurrent. Their violent offending was attributed to the increasing cost of psychoactive substances, prompted by their increased use. Unlike the early-onset girls, peers played a more direct role in the later-onset girls’ initiation of violent offending and substance use (Baskin & Sommers, 1998).

The long-term associations of substance use and delinquency also are affected by other factors. These factors include age, type of psychoactive substance, frequency and duration of psychoactive substance use, and type and level of delinquency (Pernanen, Cousineau, Brochu, & Sun, 2002).

Specific Psychoactive Substances and Specific Delinquent Acts

Alcohol and marijuana have been consistently found to be the most common substances to which adolescent female offenders attribute their legal problems (Fejes-Mendoza & Miller, 1995; Kataoka et al., 2001). One study, based on a community sample, revealed that girls who engaged in heavy or hazardous alcohol consumption and who experienced alcohol-related problems were 5.7 times more likely to report violent offending and 12.7 times more likely to report property offending than were girls who did not misuse alcohol (Lynskey, 2001).

Using data from the National Longitudinal Study of Adolescent Health, Van den Bree and Pickworth (2005) found that delinquency was associated with all five stages of marijuana involvement, ranging from initiation of experimental use to failure to discontinue regular use. Fagan, Weiss, and Chen (1990) found that marijuana was the most frequently used substance among a sample of inner-city girls who reported committing petty and minor delinquent acts. Conversely, alcohol was the most frequently used psychoactive substance among girls who reported committing serious delinquent acts (e.g., felony assault, robbery, or felony theft). Heroin, cocaine, and PCP were used less frequently than marijuana and alcohol, but the most frequent use of these psychoactive substances was found among the least serious offenders.

Studies conducted with samples of incarcerated girls demonstrate that alcohol and substance use are related to violence and/or violent offending (Holsinger & Holsinger, 2005). Prinz and Kerns (2003) found that female juvenile offenders who initiated any type of substance use at age 12 or earlier had a higher likelihood of being arrested for substance-related and violent offenses. Females who initiated alcohol use prior to age 10

had a higher likelihood of being arrested for substance-related offenses, with 18% reporting alcohol use by age 10 and 39% reporting alcohol use by age 13. By age 13, 30% were using marijuana one or more times per month. Although the focus of Prinz and Kerns's study was not on factors associated with early onset of substance use among juvenile female offenders, several studies have found that sexual abuse appears to be associated with early onset of substance use among girls involved in delinquency (Acoca, 1999; Mason, Zimmerman, & Evans, 1998; Van Brunschot & Brannigan, 2002).

Yet the question remains: Are specific types of psychoactive substances related to specific types or forms of delinquency? This question is important, given that classes of psychoactive substances (e.g., depressants, stimulants, opiates, and hallucinogens) have distinct liabilities, psychopharmacological effects, and addictive properties. For example, depressants are a class of chemicals that alter the functioning of the central nervous system, leading to impairment of the motor and intellectual processes; stimulants produce an increased sense of alertness and energy, elevated mood, and decreased appetite; opiates produce psychopharmacological effects similar to depressants but with comparatively less impairment of the motor and intellectual processes; and hallucinogens produce effects that induce altered perceptions, thoughts, and feelings (McNeece & DiNitto, 2005).

In light of evidence indicating that the use of multiple psychoactive substances is relatively common among populations of serious substance users and serious delinquents, and given that the effect of the consumption of a single psychoactive substance is not always well understood (Pernanen et al., 2002), answering this question remains a challenge. It is complicated further by the need to consider the dosage; the method of

consumption; time-linked factors (e.g., tolerance and withdrawal); and characteristics such as sex, age, weight, metabolic characteristics, and hormonal responses (Pernanen et al., 2002).

Based on correlational and cross-sectional studies, however, it appears that cocaine and crack cocaine are associated with prostitution (Dembo et al., 1993). The use of marijuana and alcohol also has been found to be associated with prostitution (Inciardi et al., 1993). Among females with histories of serious delinquency, greater levels of prostitution (i.e., frequency of prostitution acts) have been found to be associated with higher usage levels of psychoactive substances (Inciardi et al., 1993) and with lower age of onset of substance use (Inciardi, Pottieger, Forney, Chitwood, & McBride, 1991).

Explanatory Models

On one level, substance use and delinquency are linked because substance use, by legal definition, is a delinquent act. Aside from the legal definition, however, three prominent explanatory models have been offered to account for the interplay between substance abuse/substance use and delinquency: (a) substance abuse causes delinquency; (b) delinquency causes substance abuse; and (c) substance abuse and delinquency share common etiologies or might be caused by a third variable. Each model and the empirical data (generated from studies of all-female adolescent samples or mixed-gender samples) that refute or support the model are described below.

Substance Abuse Causes Delinquency

This direct causal model posits that delinquent behavior is attributed to the need to obtain money or goods to acquire or pay for a psychoactive substance (Watters, Reinerman, & Fagan, 1985). Moreover, the psychopharmacological effects of the

psychoactive substance induce disinhibitions, lessen self-constraint, disrupt parts of the brain that are used to weigh risks and benefits when making decisions, and impair cognitive processes such as the higher-order processing of information, thereby increasing the likelihood of an adolescent engaging in other delinquent behaviors (Pernanen et al., 2002).

Contrary to the broader research on the relationship between adolescent substance abuse and delinquency, research conducted with samples of girls provides some support for the idea that delinquent acts are committed to purchase or obtain psychoactive substances. Kataoka et al. (2001) found that the majority of adolescent female detainees with a substance use problem had engaged in illegal activities to obtain psychoactive substances, and that the commission of illegal acts was the most common problem attributed to their substance use. Likewise, Bagley and Young (1987) found that among a sample of former female juvenile prostitutes, 40% reported that their main reason for entering prostitution was to obtain money to support a substance abuse habit.

The psychopharmacological explanation has received little empirical support in research conducted with broader adolescent samples (White, 1990). Although Fejes-Mendoza and Miller (1995) found that 50% of the girls in their sample of 100 reported being under the influence of psychoactive substances during the commission of delinquent acts, the delinquent acts could not be attributed to the psychopharmacological effects of the psychoactive substances because patterns of consistent psychoactive substance use were also a part of the girls' daily routines.

Delinquency Causes Substance Abuse

This direct causal model is based on the notion that delinquency exposes adolescents to social situations, negative peer influences, and negative reference groups, affording adolescents greater access to psychoactive substances and promoting a course that leads to substance abuse. There is more support for this model than for the model of substance abuse causing delinquency, “even though most relevant studies have not been conducted in causal terms but have simply addressed the question of whether delinquency occurs prior to substance abuse or vice versa” (Otero-Lopez et al., 1994, p. 460). The establishment of the temporal order is a necessary condition, but not a sufficient condition, to establish causality.

The findings of studies conducted with samples of adolescent girls characterized as serious delinquents appear to be mixed. For example, in their study of 62 adolescent females with histories of serious delinquency, Leve and Chamberlain (2004) found that a younger age at the time of first arrest was significantly related to a subsequent increase in delinquency but was not related to subsequent substance use, whereas Inciardi et al. (1993) found that among a sample of 100 girls characterized as serious delinquents, substance use and serious delinquency were concurrent. The mean age for both behaviors was 10.8 years.

Conversely, Baskin and Sommers’s (1998) study of 170 women offenders with histories of violent crime revealed that 60% initiated violent offending during their adolescent years and that their experimentation with psychoactive substances took place within the context of “hooky parties” (leaving school to have parties). During these parties they engaged in a range of behaviors, including shoplifting, burglary, robbery, and

later, drug experimentation; the latter frequently was followed by initiation into the drug trade as a seller.

Etiology, Substance Abuse, and Delinquency

This model posits that there is no direct link between substance abuse and delinquency but that substance abuse and delinquency are related either because they share or are influenced by a cluster of common biological, personal, or social causes or because they may have a common etiological origin. Common factors that promote substance abuse and delinquency among girls include problems at home, problems at school (Garnefski & Okma, 1996), sexual and/or physical abuse, familial substance abuse, familial criminal involvement (Dembo et al., 1997; Spatz-Widom, 2000), inadequate or inappropriate supervision (Brook, Whiteman, Finch, & Cohen, 1996), and involvement with delinquent peers (Elliott et al., 1985).

Although substance abuse and delinquency may have common roots, there also appear to be distinct factors that give rise to these respective behaviors. These factors have been illuminated mainly in research investigations examining substance use and delinquency within a single framework or in research examining the phenomena simultaneously. For example, Fishbein and Perez (2000) found social isolation to be a distinct factor associated with substance use, and impulsivity to be a distinct factor associated with delinquency among girls in their sample.

Using cluster analytic techniques, Raskin-White (1993) conducted a longitudinal study to test for factors that distinguished a sample of adolescents who used marijuana from those who engaged in delinquent behaviors. She found that marijuana use and delinquency did not cluster together in one group. A majority of the girls sampled was

not involved heavily in both behaviors; some were involved heavily in one behavior but not the other, and a small minority was involved heavily in both. Findings also revealed differences in developmental patterns of marijuana use and delinquency, further negating the explanation of a common etiological configuration. Given these findings, Raskin-White suggests that a coincident rather than a common-cause hypothesis may best explain the relationship between the two behaviors, because the behaviors of substance use and delinquency both tend to occur during adolescence.

Despite the occurrence of both behaviors during adolescence, there appears to be different age curves for substance use and delinquency (Elliott, Huizinga, & Menard, 1989); consequently, these researchers posed this question: “If both delinquency and substance use are caused by a common etiological configuration, why do these alternative sets of causes follow a different course over the adolescent and early adult years?” (p. 194). One reason could be that similar conditions, factors, and experiences promote both behaviors but that factors associated with the maintenance of either behavior may be distinct (Raskin-White, 1993).

In addition to an explanation based on common factors or common causes, this model posits that the relationship between substance abuse and delinquency may be caused by a third factor. Relatively few studies, however, have examined the possible common antecedents of substance use and delinquency among the broader population of adolescents. Brook et al. (1996) examined the phenomenon of physical aggression as a possible antecedent of substance use and delinquency. Findings revealed that physical aggression directly caused substance use and indirectly caused delinquency. Physical aggression was not a common cause of substance use and delinquency among adolescent

females or males because the relationship between substance use and delinquency remained significant even while controlling for childhood aggression. Different results might have been found if the researchers had examined more serious forms of delinquency or had excluded behaviors that did not reflect delinquent acts (e.g., cheating on tests or driving car without parental permission).

Given that research has shown a consistent association between child victimization and substance use and delinquency, child victimization also may be a potential third factor. Among a mixed-gender sample, childhood victimization (sexual abuse, physical abuse, and neglect) was found to be a statistically significant predictor of an alcohol- or drug-related arrest in adulthood. Females with a history of child victimization were more likely than the comparison group to have alcohol or drug arrests in adulthood but were no more likely than the matched comparison group to be arrested for alcohol- or drug-related offenses as juveniles (Spatz-Widom, 1995). Findings also revealed that, irrespective of gender, individuals who experienced childhood victimization were more likely to be arrested as juveniles, and those who were arrested as juveniles had a greater likelihood of being arrested for alcohol or drug offenses as adults.

In their prospective study conducted with 206 women with histories of sexual abuse and a matched comparison group of 205 women, Siegel and Williams (2003) obtained similar findings, which revealed, surprisingly, that girls with histories of sexual abuse were no more likely than girls in the comparison group to be arrested for substance-related offenses as juveniles, although they were more likely to be arrested as adults. Siegel and Williams attributed that finding to a period effect and/or to the temporal sequence of the behaviors of substance abuse and delinquency. They asserted:

The finding could be related to the period during which the majority of the women in this sample were at risk of juvenile arrest because it preceded the increased efforts directed at enforcement of drug laws that began in the 1980s. That in turn could have meant that the probability of an arrest for a drug offense was relatively low. Furthermore, a considerable amount of research indicates that criminal activity precedes serious drug use, which could indicate that involvement with drugs becomes serious enough to result in an arrest only as a woman ages and that a girl could incur a juvenile record without any evidence of drug offending. (p. 87)

Siegel and Williams's (2003) findings might also be attributed to the age of the onset of substance use and delinquent behaviors among girls or to the researchers' use of official arrest data and a community-based sample. For example, Baskin & Sommers (1998) found that the delinquency and substance use trajectories of early-onset and late-onset girls differed. Among early-onset girls, drug use (until the point of abuse) appears to be ancillary to a more generalized lifestyle of deviance until the girls become entrenched in the drug market. Conversely, because substance use appears to be the central focus among the late-onset girls, the point of addiction for this group may not occur until after age 18.

Moreover, because early-onset girls are involved in other serious delinquent behaviors, they may be arrested for offenses deemed more serious than drug-related offenses. This finding was borne out in Siegel and William's (2003) study, which showed that girls with a history of sexual victimization had been arrested for more serious offenses than had girls without a history of sexual victimization. When offending begins

early in a girl's life, childhood victimization is posited to be the main cause of offending (Chesney-Lind, 2001). However, Siegel and William's (2003) study was based on data gathered from official arrest reports, and therefore substance-related offenses may not have been captured; official arrest data are usually classified by the most serious offense charged.

Summary

In summary, support for each of the three explanatory models can be found in the literature, depending on the sample examined (Huizinga, 1997; Paradise & Cauce 2003). It is often concluded, however, that a single causal model cannot account for the relationship between substance abuse and delinquency (Ball, Rosen, Flueck, & Nurco, 1981; Raskin-White, 1990; Watters et al., 1985). For instance, Ball et al. (1981) contend that

the concept of a single, invariant causal agent is an inappropriate, and hence, a fallacious explanation for most human behavior. It is no longer meaningful to talk of the cause of crime, or the cause of drug use. There are various reasons why individuals engage in crime and drug use. (p. 41)

Some researchers view the relationship between substance use/abuse and delinquency as stemming from factors within an individual's life course: personality; socialization experiences preceding and accompanying substance abuse or dependency; age and social context at the start of the substance abuse; personal and social dynamics of substance abuse and delinquency; substance abuse or dependence of reference groups; and social policies (MacCoun, Kilmer, & Reuter, 2003).

Because the behaviors of humans are less than deterministic phenomena, many researchers either subscribe to the third-factor or the common-etiology model of the substance abuse–delinquency relationship. Other researchers, however, argue in favor of more complex explanatory models (Da Agra, 2002; Watters et al., 1985). Proponents of complex explanatory models refute both simple direct-causal models and spurious models, and they support more contingent, processual, structural, and mediating explanations of the substance abuse–delinquency relationship (Da Agra, 2002). Advocates of complex explanatory models recognize that substance abuse and delinquency are heterogeneous phenomena, and that the setting, social context, social mechanisms, intervening processes, and motivation of individuals are critical to understanding the substance abuse–delinquency nexus (Watters et al., 1985).

On the basis of the foregoing review, it seems possible to conclude that there is a link between substance use and delinquency among girls but that the relationship is complex. Many girls involved in the juvenile justice system, particularly girls in detention and youth development centers, have a substantially higher prevalence of substance use and/or substance use disorder than do girls in the general population. Among girls, it seems more likely that delinquency is an indicator of substance misuse and mental health problems than that substance misuse and mental-health problems are indicators of delinquency (Dixon et al., 2004; Fagan & Wester, 2003; Huizinga et al., 2000).

Girls who engage in the behaviors of serious substance use and delinquency—both respectively and concomitantly—are heterogeneous in terms of their levels, types, and patterns of delinquency and in terms of their levels and patterns of substance use.

Surprisingly, it appears that the use of psychoactive substances such as cocaine, heroin, and PCP is more prevalent among populations of girls who commit status and/or less serious offenses, whereas the use of alcohol and marijuana is more prevalent among the most serious offenders (Fagan et al., 1990; Raskin-White, 1993; Rodriguez & Webb, 2004).

Considering the complexity of the substance use/abuse–delinquency relationship, researchers need to extend their research beyond examinations of simple, direct causal relationships between the two behaviors. This is particularly true in light of findings that show significant, although weak and moderate, associations between substance use/abuse and delinquency (Holsinger & Holsinger, 2005; Huizinga et al., 2000). There is a strong need for researchers to examine the intervening, moderating, and situational processes that aggravate or mitigate the relationship between these two behaviors.

Treatment and Interventions

Because the causal processes involved in the etiology, maintenance, and escalation of serious substance use and delinquency are multiple and complex, interventions developed to reduce these problems must be multifaceted and theory driven, and they must target a broad range of empirically supported risk and protective factors (Catalano & Hawkins, 1996; Dembo & Williams, 1994; Dodge & Pettit, 2003). To be most effective, interventions must target modifiable risk factors. In addition, because multiple risk factors are likely to produce the co-occurring behaviors of serious substance use and delinquency, interventions must be directed toward many of those factors (Dodge & Pettit, 2003). Interventions that address only a narrow set of risk factors may be insufficient for addressing the scope of the problem (Sukhodolsky & Ruchkin, 2006), and

single-component interventions (i.e., those focusing on one problem at a time) are likely to be unsuccessful, given the multiple forces that operate to produce antisocial behaviors (Dembo & Williams, 1994; Dodge & Pettit, 2003). Multicomponent interventions appear to be promising, particularly those that are based on a carefully articulated causal model (Rutter et al., 1998).

Few existing multimodal interventions target youths with serious substance use and delinquency problems; this is particularly true in the case of adolescent females (Molidor, Nissen, & Watkins, 2002). In this section, I review multimodal interventions that have been deemed promising by expert consensus or that have a body of empirical evidence demonstrating their effectiveness for treating adolescents with the co-occurring problems of substance abuse and delinquency. Such interventions include multisystemic therapy, multidimensional foster care, juvenile drug court, and therapeutic communities.

Multisystemic Therapy

Multisystemic therapy (MST) is a comprehensive, intensive family- and community-based treatment, informed by the social ecological model (Bronfenbrenner, 1979). MST addresses the multiple determinants related to serious, chronic, and violent offending, substance abuse, and family problems among juvenile offenders age 12 to 17. It targets offenders at high risk for out-of-home placement, and their families. Consistent with social ecological models, the multisystemic approach is based on the conceptualization that individuals are nested within a complex network of interconnected systems that encompass factors related to the individual, the family, peers, the school, and the neighborhood (Schoenwald et al., 2000).

MST addresses instrumental goals (improved family relations, peer relations, social competence, and decreased symptomatology in the youths and parents) as well as

the outcome goals of decreased criminal activity, incarceration, and substance use. These goals—ultimate and instrumental—are achieved by intervening in systems and processes known to be associated with antisocial behavior, such as ineffective parental discipline, family affective relations, favorable attitudes toward substance use, antisocial peer associations, poor school performance, and low social support (Heneggler, Melton, & Smith, 1992; Heneggler, Pickrel, & Brondino, 1999).

MST is one of the most systematically evaluated treatment models (Terry, VanderWaal, McBride, & Van Buren, 2000), but most of the research examining the effectiveness of MST has been conducted by its developers. One of the earliest studies examining the effectiveness of MST was conducted by Heneggler et al. (1992), who examined the efficacy of MST in treating serious juvenile offenders and their families. The results of their study revealed that at the 59th week postreferral, youths who participated in MST had significantly fewer arrests and a lower rate of recidivism than did youths in the usual service condition. In addition, the researchers examined the moderating effects of age, race, gender, social class, and arrest history. They found that MST was equally effective with youths across age, race, gender, and social class.

Heneggler et al. (1999) examined the effectiveness of MST in a study conducted with 118 juvenile offenders with a *DSM-III-R* diagnosis of substance abuse or substance dependence. The outcomes of this MST clinical trial were relatively modest: The MST intervention was effective in decreasing substance use during the period shortly after treatment termination (T2); however, such changes were not maintained at the 6-month follow-up (T3), particularly among females and younger adolescents. From T2 to T3, females in the MST condition deteriorated substantially. Similar findings were obtained

among younger adolescents. At 6-month follow-up, MST-related reductions in re-arrests and self-reported offending were not significant.

Using 80 (68%) of the 118 MST and usual service participants from the same sample, Henegger, Clingempeel, Brondino, and Pickrel (2002) conducted a 4-year follow-up study on the effectiveness of MST. Findings revealed that MST was associated with a significant reduction in convictions for aggressive crime. Official and self-report data at 4-year follow-up indicated that MST participants had committed significantly fewer aggressive crimes than had their counterparts in the usual service condition. In the case of property crimes, there were no significant between-group differences.

Findings regarding illicit substance use were mixed. Based on self-report measures of marijuana and cocaine use, there were no significant between-group differences. However, findings based on biological measures (i.e., urine and hair specimens) demonstrated that MST participants had significantly lower rates of marijuana use than did usual service participants. There were no significant between-group differences in rates of cocaine abstinence. Finally, despite findings at 6-month follow-up demonstrating that females in the MST condition deteriorated substantially on the outcome of substance use, there were no significant moderator effects at 4-year follow-up. Thus, the long-term effects of treatment did not vary as a function of gender or age.

To date, there has only been one study of the effectiveness of MST among juvenile offenders, which was conducted by independent investigators in the United States. Timmons-Mitchell, Bender, Kishma, and Mitchell (2006) conducted a study to determine whether the effects of MST on the outcome of re-arrests would be replicated in a clinical trial conducted with 93 juvenile offenders. In their study, 48 youths were

randomly assigned to the MST condition and 45 youths were assigned to the treatment as usual condition. Girls were included in the sample; however, the gender composition of the sample was not stated. At the 18-month posttreatment follow-up, the MST participants had a significantly lower rate of recidivism and had significantly fewer new offenses, arrests, and arraignments than did participants in the treatment as usual condition. Participants in the treatment as usual condition were 3.2 times more likely than participants in the MST condition to be re-arrested. In the case of substance use, there was no significant between-groups difference at the 6-month posttreatment follow-up.

Multidimensional Treatment Foster Care

Multidimensional treatment foster care (MTFC) is a community-family treatment theoretically grounded in social learning theory and informed by research related to the development of antisocial behavior and coercive family processes. MTFC is for adolescents with histories of chronic and serious delinquent behaviors who are at risk of incarceration. Adolescents are placed in the homes of trained MTFC-community families, who provide a structured and therapeutic environment comprising intensive supervision at home, in school, and in the community. MTFC-community families use a daily behavior management system that is based on the point-and-level system, which emphasizes clear and consistent limits, positive reinforcement for appropriate behavior and follow-through, and disciplinary consequences for negative behavior (Fisher & Chamberlain, 2000). The approach is designed to teach and reinforce prosocial behaviors through the use of social and cognitive skills training and to provide participants with a relationship with a mentoring adult.

MTFC has been tested in two randomized trials. The first efficacy study was conducted with an all-male sample (Chamberlain & Reid, 1998). The second efficacy

study was conducted with an all female sample (Leve, Chamberlain & Reid, 2005). Leve, Chamberlain, and Reid (2005) tested an adapted version of MTFC with a sample of 81 girls in the juvenile justice system. The adapted version included training community families/foster parents to provide positive reinforcement for girls' avoidance of social-relational aggression, and disciplining consequences for girls' commission of social-relational aggression. Girls were taught strategies for avoiding social-relational aggression and for regulating their emotions.

The results of the randomized trial, in which girls were randomly assigned to MTFC (37 girls) or to the control condition of group care (44 girls), revealed that the MTFC intervention was more effective in reducing rates of incarceration and delinquency than was the control condition. The findings of this study indicate that the effectiveness of the MTFC approach is promising (Leve et al. 2005).

Juvenile Drug Courts

Juvenile drug courts are special courts within the traditional juvenile justice system, which integrate substance abuse treatment. Their purpose is to provide comprehensive services for substance-involved juvenile offenders (Belenko & Logan, 2003). The intervention targets juveniles with substance abuse problems and a delinquent history of nonviolent drug or drug-related offenses. In some instances, substance-abusing juveniles with simple assault offenses are included. The key goals of juvenile drug courts are to reduce substance use and delinquency.

The key components of juvenile drug courts include (a) judicial leadership, monitoring, and supervision of treatment and drug testing through weekly, biweekly, or monthly required court attendance; (b) individual treatment plans that are

developmentally based, gender sensitive, and culturally appropriate; and (c) mandatory family involvement (Belenko & Logan, 2003; CASA, 2003). The juvenile drug court model uses a collaborative approach involving the judge, the defense attorney, the prosecutor, the substance abuse treatment provider, the case manager, the family therapist, the probation official, the law enforcement official, and the youth's family. The major function of the team is to promote the rehabilitation of each juvenile by addressing how best to deal with his or her substance-abuse, substance-related, and legal problems. Accountability is a major part of the treatment process; accordingly, a series of graduated sanctions and rewards is used. Sanctions are imposed for treatment noncompliance and incentives are provided to recognize, encourage, and facilitate progress (CASA, 2003). The standard duration of treatment is usually 12 months.

Although many juvenile drug courts use empirically supported treatment approaches (e.g., developing drug-refusal skills, improving parental discipline, or involving youths in prosocial activities), the outcomes of juvenile drug courts do not appear to be promising (Heneggler et al., 2006; Rodriguez & Webb, 2004). For example, using a quasi-experimental design to measure the program effects of a juvenile drug court intervention on the outcomes of delinquency and substance use, Rodriguez and Webb (2004) compared 204 youths who participated in the drug court with 114 youths who were placed on standard probation. Their findings revealed that only (30%) graduated from drug court, 44% were released from the program and directly placed under some form of correctional supervision, and 18% were placed on standard probation. Overall, the majority of the participants in the juvenile drug court were unsuccessful in meeting treatment and program requirements.

In another evaluation of the effectiveness of juvenile drug court, Heneggler et al. (2006) conducted a four-condition randomized design with intent-to-treat analyses to evaluate 1-year outcomes of substance use, delinquent behavior, and incarceration among 161 juvenile offenders with a *DSM-IV-TR* (2000) diagnosis of substance abuse or dependence. The four treatment conditions were (a) family court with community services ($n = 42$); (b) juvenile drug court ($n = 38$); (c) drug court with multisystemic therapy ($n = 38$); and (d) the integration of drug court, multisystemic therapy, and contingency management (CM), a treatment approach based on the systematic reinforcement of desired behaviors ($n = 43$).

At the 1-year period, youths assigned to the integrated condition of drug court (DC), MST, and CM reported significantly less alcohol use than did their counterparts assigned to the condition of family court with community services (FC). In the case of heavy alcohol use, participants in the DC/MST and the DC/MST/CM conditions reported significantly less heavy alcohol use than did participants in the FC condition. Likewise, participants in the DC/MST and the DC/MST/CM conditions reported significantly less polydrug use. Participants assigned to each of the DC treatments reported committing fewer status offenses than did participants in the FC condition. Participants in the DC and DC/MST/CM conditions reported committing fewer crimes against persons than did participants in the FC condition. There was a higher number of re-arrests for participants in the three DC conditions compared with FC participants; the differences, however, were nonsignificant (Heneggler et al., 2006).

Arguably, these findings demonstrate that the juvenile drug court interventions were more effective than the family court intervention in decreasing the behaviors of

delinquent activity (i.e., status offenses only) and substance use. However, in findings that echo those of Rodriguez and Webb (2004), reductions in these behaviors did not translate into corresponding decreases in re-arrest or incarceration among participants in the drug court (Heneggler et al., 2006). Both sets of researchers attributed these findings to the intensive surveillance of participants involved in drug court interventions. Another common finding across studies was that participants in the drug court intervention experienced high rates of out-of-home placements. These less than promising outcomes may be attributed to the lack of research and theory-based interventions used in juvenile drug court programs (Belenko & Logan, 2003). The integration of evidence-based clinical services and practices in juvenile drug courts have been largely ignored.

Therapeutic Communities

Therapeutic communities (TCs) are intensive, comprehensive residential treatment programs that provide highly structured, prosocial environments for the treatment of substance abuse/dependence. TCs were initially designed for adults but have been modified to treat adolescents with substance use disorders. Modifications of the TC model for adolescents include (a) shortened duration of stay, (b) family involvement in the treatment process, (c) a more hierarchical authority structure, (d) more emphasis on education and actual schoolwork, and (e) less use of confrontational approaches (Jainchill, 2000; NIDA, 2002b).

A key feature of the TC modality is its community-as-change model. The community encompasses the social environment, peers, and program staff. One of the basic premises of TCs is that participating in a therapeutic community of peers who are struggling with similar issues promotes rapid progress through stalled or delayed developmental stages (Jainchill, 2000). TCs rely on group processes and peer support to

assist residents in addressing issues related to their substance abuse, delinquency/criminality, and family relationships. Because substance abuse is viewed as a symptom of broader problems, a holistic approach to treating substance abuse is emphasized (U.S. Department of Health & Human Services, 1993). Holistic approaches address practically every aspect of residents' lives and emphasize comprehensive lifestyle changes (Weinman & Dignam, 2002).

Given that TCs were originally developed for populations of adults, much of the outcome research has been conducted with samples of adults. TCs, however, have been posited to be effective with males, females, adolescents, and diverse racial and ethnic groups (Deitch, Carleton, Koutsenok, & Marsolais, 2002).

Jainchill, Hawke, De Leon, and Yagelka (2000) have conducted the only TC study using a sample of adolescents. They examined 12-month outcomes of substance use and criminal activity in a sample of 485 adolescents (71% were male, 60% were White). The researchers examined pre- and posttreatment levels of substance use and criminal activity among adolescents who completed (295) and did not complete (190) treatment. At the 12-month follow-up there was a significant reduction in reported substance use among the total sample. Adolescents who completed treatment (completers) reported a significant decline in any type of drug use at the 12-month follow-up. Adolescents who did not complete treatment (noncompleters) reported a nonsignificant reduction in substance use at the 12-month follow-up. A comparison of differences indicated that noncompleters had a higher percentage of psychoactive substance use at the 12-month follow-up than did completers.

In terms of criminal activity, in the 12 months following treatment there was a significant reduction among the total sample in self-reported involvement in any criminal

activity as well as in specific types of criminal activity: use/possession of drugs, sale/distribution of drugs, property crimes; violent crimes, and “hustles” (i.e., fraud, forgery, gambling, and prostitution). Arrests among the completers decreased from 78% in the year of pretreatment to 24% in the posttreatment year; among noncompleters, the percentage of arrests decreased from 76% to 46%. There were no significant differences between the two groups in the rates of involvement in any criminal activity at the 12-month follow-up. The findings of this study need to be interpreted cautiously, given the detection of underreporting biases for the use of marijuana. Self-report data on use of psychoactive substances were corroborated with biological measures (i.e., urine and hair specimens) (Jainchill et al., 2000).

Jainchill et al. (2000) also examined predictors of positive posttreatment outcomes. They found that several variables were associated with declines in psychoactive substance use: (a) Latina origin, (b) relationship with counselor, (c) completing treatment, (d) not associating with deviant peers, and (e) not living with one's family of origin. The variables found to be significantly associated with less criminal activity included being female, having completed treatment, and not associating with deviant peers. Thus, in the case of both substance use and criminal activity, completing treatment and not associating with deviant peers increased the odds of better outcomes. Because this has been the only outcome study conducted with an adolescent sample, more research—based on rigorous designs—is required to document the effectiveness of therapeutic communities.

Summary

Many of these treatment interventions reduced the behaviors of substance use and delinquency. However, the effectiveness and efficacy of these interventions remain unknown. We need more randomized control trials conducted by independent investigators, more long-term follow-ups, and more methodological rigor for studies using quasi-experimental designs. In most instances, what remains unknown is for whom and under what conditions the interventions are effective.

Given that only one randomized trial was conducted with an all-female sample, and that the samples in many of the outcome studies were predominantly male, there is insufficient evidence to make recommendations about the effectiveness of existing interventions for populations of females with the co-occurring problems of substance abuse and delinquency. Thus, there is a particular need for more controlled evaluations that assess treatment outcomes of adolescent girls with histories of substance abuse and serious delinquency. Finally, and of great importance, researchers conducting randomized trials and outcome studies need to conduct subgroup analyses to demonstrate the efficacy or effectiveness of an intervention for subgroups based on gender, race, and risk levels (Society for Prevention Research, 2004).

CHAPTER 3

THEORETICAL FRAMEWORK: THE BIOPSYCHOSOCIAL MODEL OF CONDUCT DISORDER

No existing theoretical model can explain fully or describe comprehensively the relationship between substance use/abuse and delinquency. Explanation of the nature of the substance abuse–delinquency nexus is further complicated because substance abuse and delinquency are not single behaviors. Each is a multifaceted behavior, with attendant pathologies and varying etiologies. Nonetheless, despite the complexity of explaining the etiology of the substance abuse–delinquency relationship, and the multiple causes involved in the co-occurring phenomenon, we need to identify key risk mechanisms to develop more focused and potentially effective interventions. In this chapter, I review risk factors associated with the behaviors of serious substance use and delinquency among girls, and I describe the biopsychosocial model of antisocial development/conduct disorder, a theory of intervention that frames the current study.

Risk Factors Associated With Substance Abuse and Delinquency Among Females

Although the relationship between substance abuse and delinquency remains elusive, many of the risk factors for serious delinquency are also risk factors for serious substance use. Given this overlap, interventions that target shared, modifiable risk factors of the two behaviors will probably be most successful. Thus, one of the first steps in the development of potentially effective treatment-based interventions for female juvenile

offenders is to have knowledge of the risk factors associated with both substance abuse and delinquency, and those factors that may mediate the transition from antecedent/distal risk factors to the onset, severity, or duration of such behaviors. Multiple interacting factors contribute to the behaviors of substance abuse and delinquency among girls, including biological/genetic predispositions, family, peers, school, community, and sociocultural predispositions.

Genetic Factors

Girls' substance abuse and delinquency are influenced by genetic factors. Genetic factors have been posited to play more of a major role than environmental factors in determining whether substance use will progress into substance abuse or dependency (CASA, 2006). Environmental factors appear to play a role in the initiation of substance use, but genetic factors are the primary source of liability to substance use disorders (Beirut et al., 1998; Dinwiddie & Reich, 1993; Merikangas et al., 1998). One study conducted with adopted and twin children found that parents transmit behaviors of alcohol, tobacco, and illicit substance use to their children (Dinwiddie et al., 1998). Moreover, girls who have been exposed prenatally to alcohol or tobacco appear to be more vulnerable than boys to smoking and drinking in adolescence and adulthood (Prescott, Aggen, & Kendler, 1999).

Findings of several studies reveal that girls who were prenatally exposed to cocaine exhibited increased aggression compared to nonexposed girls (Nordstrom Bailey et al. 2005; Sood et al., 2005). Conversely, Delaney-Black et al. (2004) found no significant differences in behavioral problems between girls prenatally exposed and nonexposed girls. It has been posited that when aggressive behaviors co-occur with

particular other phenomenon in childhood, notably academic failure in school, the boy or girl is at risk for a range of problems in late adolescence, including early school dropout, arrests for both property and violent crime, and teenage parenthood. (Cairns & Cairns, 2000, p. 418)

Genetic risks for externalizing and antisocial behaviors and depression also have been found in samples of girls and boys (O'Connor, McGuire, Reiss, & Plomin, 1998). However, genetic and environmental factors appear to influence these behaviors equally. For example, girls who commit delinquent acts are more likely to be reared in families characterized by psychopathology, mental illness, and a familial history of antisocial behavior (McCabe et al., 2002). Thus, these factors may be conferred genetically, or life experiences with parents and other family members may provide an opportunity for girls to model these behaviors.

Puberty

During adolescence, as girls begin to experience hormonal changes, develop secondary sex characteristics, transition into their distinct identities, and develop a moral and ethical sense, they are at heightened psychological risk. This is particularly true of girls who experience early pubertal maturation; these girls are at an increased risk of engaging in substance use at an earlier age (CASA, 2003) and are at a greater risk of delinquency (Caspi, Lynam, & Moffitt, 1993). Caspi et al.'s findings also revealed that early-maturing girls in mixed-gender settings were at greater risk of involvement in delinquency than were their early-maturing peers in same-gender settings. Stattin and Magnusson (1990) found that elevated levels of delinquency among girls who experienced early menarche were linked to their association with older males.

Furthermore, substance abuse among female adolescents is strongly associated with a relationship with an adult boyfriend (Mezzich et al., 1997).

Haynie (2003) found that girls who were more physically developed relative to their same-grade peers had higher rates of involvement in minor and serious delinquency. She also found that the social factors of child-parent relationship, romantic relationships, and deviant peer associations mediated the relationship between girls' pubertal development and their involvement in delinquency. Child-parent relationship was an important mediating factor of the association between puberty and serious delinquency. It appears that the social context, in combination with the biological characteristic of early puberty, may provide increased opportunities for girls' involvement in substance use and delinquency. For example, because early pubertal maturation contributes to physical bodily changes, these changes may signal to girls and others that they are ready to handle adult roles, which may lead to involvement in risk-taking behaviors through contact with older peers or with older males (Coie, Miller-Johnson, & Bagwell, 2000).

Physiological/Biological Response

Research indicates that girls' physiological response to the use of psychoactive substances is attributed to their faster progression from mild to more severe substance involvement, suggesting greater addictive liabilities (Chen & Anthony, 2004). They become addicted to nicotine and cocaine at a faster rate than do boys, and their alcohol use spirals into alcohol abuse faster than boys' (Greenfield, 2002; Hommer, Momenan, Kaiser, & Rawlings, 2001). Moreover, engaging in substance use at an earlier age has been associated with a faster progression from mild to severe substance involvement. And the earlier a youth engages in severe substance involvement, the likelier he or she is

to be arrested (CASA, 2004). Prinz and Kerns (2003) found that female juvenile offenders who initiated any type of substance use at age 12 or earlier had a higher likelihood of being arrested for substance-related and violent offenses. And those who initiated alcohol use prior to age 10 had a higher likelihood of being arrested for substance-related offenses.

Psychological and Mental Health Factors

Depression is the most common mental health disorder associated with substance abuse and delinquency in populations of girls. Preliminary studies reveal that depressed girls are more likely to commit property crimes and crimes against other people than are their nondepressed counterparts (Obdeillah & Earl, 1999). Goldstein et al. (2003) found that incarcerated girls with higher levels of depression also had higher rates of substance use, family discord, and suicidal ideation. Moreover, anger has been found to be a source of depression in adolescent girls, and the effect of anger on depression has been found to be mediated partly by involvement in delinquency (Hagan & Foster, 2003).

Depression is related to poor-quality friendships, interpersonal stressors (Hammen, Brennan, & Shih, 2004), and social deficits (Rudolph & Asher, 2000). Obdeillah and Earl (1999) hypothesized that the characteristics of depressed adolescents (i.e., withdrawal, limited interests, and low self-esteem) place them at risk of being rejected by prosocial peers. They contend that being rejected by prosocial peers leads to depressed adolescents associating with other rejected peers, thus leading to the formation of a network of deviant peers. And through this association depressed adolescents are more likely to engage in delinquent behaviors.

Victimization and Trauma

Research has shown a strong correlation between exposure to trauma and victimization (e.g., sexual abuse, physical abuse, or family violence) and substance use (Sarigiani, Ryan, & Peterson, 1999; Snyder & Sickmund, 1995) and juvenile delinquency (Bowers, 1990; Koroki & Chesney-Lind, 1985) among girls. Spatz-Widom (2000) found that abused and neglected girls were twice as likely as girls who had not been abused and neglected to be arrested as juveniles, and twice as likely to be arrested as adults. She asserts that because many abused and neglected girls are likely to be reared in families with criminogenic lifestyles and to live in homes and neighborhoods characterized by violence and crime, they have many opportunities to learn and model antisocial and aggressive behavior.

Dixon et al. (2004) conducted a comparative study of 100 female juvenile offenders who were matched with a comparison group of 100 high school females on the factors of age and socioeconomic status. They found significant differences between the two groups. For example, girls who had offended had experienced significantly more trauma than had nonoffenders, with particularly high levels of personal victimization (e.g., physical and sexual abuse or violent crime). Their findings further revealed that exposure to multiple forms of victimization or traumatic events, specifically three or more, increased the likelihood of offending. Likewise, Herrera and McCloskey (2003) found that “the proportion of girls involved in delinquent behavior increased as exposure to multiple forms of abuse (i.e., witnessing marital violence, sexual abuse, and physical abuse) increased” (p. 330).

Findings of survey studies conducted by the American Correctional Association's (1990) task force and by Owen and Bloom (2000) indicate that a high percentage of females involved in the juvenile justice system have experienced sexual victimization and childhood maltreatment. If girls experience childhood sexual victimization and maltreatment, there may be long-term effects on their physical and mental health (Slater, Guthrie, & Boyd, 2001).

Girls with histories of delinquent behavior and sexual abuse are more likely to use illicit substances (Dembo et al., 1987). These histories may lead to substance use in order to self-medicate because, as noted by the Office of Juvenile and Delinquency Prevention (1998), female adolescents with sexual abuse and substance abuse histories exhibit high levels of guilt, shame, anxiety, and depression, and have lower expectations for their lives, problems with family relations, and limited vocational and educational goals. These poor social and mental health outcomes are associated with delinquency.

Family Functioning and Environment

Family functioning and the family environment appear to be factors that contribute to delinquency and substance use among girls. Many girls with histories of delinquency and substance use have lived in families characterized by familial conflict, substance abuse, criminality, and domestic violence. These experiences place them at high risk for abuse, neglect, and behavioral problems (Dixon et al., 2004; Loper, 2000; McCabe et al., 2002). Katz (2000) found that having been beaten by a parent was a significant predictor of delinquency among minority girls.

As stated previously, Spatz-Widom (2000) posits that because many abused and neglected girls are likely to be reared in families with criminogenic lifestyles and to live

in homes and neighborhoods characterized by violence and crime, they have many opportunities to learn and model antisocial and aggressive behavior. Baskin and Sommers (1998) found that girls living in family units characterized by criminal behavior were provided with routine exposure to and socialization toward the tolerance of illegal behavior.

Family processes that include the presence of physical and sexual abuse have been identified as being related to female delinquency. For example, Trickett and Gordis (2004) found that girls who were sexually victimized by their primary paternal figure had elevated scores on the Adolescent Delinquent Questionnaire. They attributed the poor outcomes of girls who had been abused by their primary paternal figure to be the result of a greater betrayal of trust and greater exploitation of love and dependency and thus a more traumatic and damaging experience. Other studies have shown that the trauma of being sexually abused by a family member is exacerbated when the victim feels that she has no one to confide in or to provide her with support after the abuse (Baskin & Sommers, 1998).

Other family processes identified as being related to serious substance use and delinquency in populations of females include inadequate or inappropriate supervision, inconsistent and harsh discipline (Cernkovich & Giordano, 1987), parental conflict, and mother-daughter conflict (Henggeler, Edwards, & Bourdin, 1987). These family processes have been posited to lead to an association with deviant peers and to subsequent substance use and problem behavior (Hops, Andrews, Duncan, Duncan, & Tildesley, 2000).

However, peer rejection and academic failure have been found to mediate the relationship between family processes and an association with deviant peers (Sroufe, Duggal, Weinfield, & Carlson, 2000). According to Rudolph and Asher (2000), family processes may influence “adaptation in the peer group through specific instruction or modeling or through the transmission of modes of functioning” (p. 164). For example, Baskin and Sommers (1998) found that girls who initiated violent offending between the ages of 11 and 15 associated with peers who reinforced earlier patterns of behavior established in interaction with family members. Thus, peers had less influence on their behavior. Conversely, among girls who engaged in violent offending after the age of 15, peers played a more direct role in their initiation into violent offending (Baskin & Sommers, 1998). For members of this group, peer initiation into violent offending influenced and changed how they interacted with their parents. This is consistent with Thornberry et al.’s (1991) findings, which demonstrate that delinquent behavior weakens familial bonds, thereby establishing a behavioral trajectory toward increasing levels of delinquency.

Deviant Peer Association

Like the family, the peer group is a prime socializing agent of antisocial development. Deviant peers appear to be a common correlate of both male and female delinquency (Latimer, Kleinknecht, Hung, & Gabor, 2003). Some studies have found that a deviant peer group is the strongest predictor of female adolescent delinquency, particularly when controlling for parents, school, and other interpersonal factors (Aseltine, 1995; Brownfield & Thompson, 1991; Gomme, 1985). Pleydon and Schner (2001) found that deviant peer groups are strongly associated with female adolescent

delinquency. They also found that females who engaged in delinquent behavior evidenced higher levels of peer pressure than did their nondelinquent female counterparts.

Similarly, Kerpelman and Smith-Adcock (2005) found that the delinquent behavior of girls is influenced by their social groups or by their girlfriends' approval of delinquent behavior. Among White girls, Katz (2000) found that early delinquency was best explained by the presence of delinquent peers. Among African American girls, Johnson (2005) found that attachment to delinquent peers was a strong indicator of delinquency.

School Experiences and School-Related Factors

School experiences and school-related problems also contribute to the behaviors of delinquency and substance misuse among girls. Factors such as poor academic performance, low bonding to school, low academic aspirations, and negative school behavior have been found to be correlates of delinquency and substance abuse in populations of girls (Latimer et al., 2003; Pulkkinen & Pitkanen, 1994). Other school-related factors, such as truancy, suspensions, and expulsions, have been found to be associated with delinquent behavior among females (Sherman, 2002). One study found that many girls with histories of delinquent behavior had negative school experiences, such as harassment by peers (Acoca, 1999). Tarter (2002) posits that alienation from school, compounded by inadequate parental supervision, may predispose a youth to engage in truant behaviors and to associate with deviant or maladjusted peers.

Community/Societal Factors

Many girls who commit delinquent acts have grown up in neighborhoods pervaded by crime, drugs, and disorganization. These sociocultural factors increase the likelihood that they will engage in the problem behaviors of substance misuse (CASA, 2003) and violent offending (Katz, 2000). Other sociocultural factors, such as socioeconomic status (Latimer et al., 2003), poverty, racism and sexism, are associated with substance use and juvenile delinquency (Slater et al., 2001). Gorman-Smith, Tolan, and Henry (2000) posit that these environmental stressors may influence family functioning, which in turn may increase a child's susceptibility to involvement in antisocial behaviors.

Summary

Substance abuse and delinquency among girls are the result of complex, interactive, and overlapping risk factors. These behaviors are determined by individual, family, developmental, peer, biological, cultural, and sociocultural factors. Because complex associations exist among these risk factors, holistic interactionistic frameworks are necessary to describe the reciprocal relations (Sroufe et al., 2000). Central to this framework is a view of the individual as an integrated psychological, biological, and social being.

From a holistic-interactionistic perspective, the behavior of an individual "cannot be fully understood if functioning of one of the subsystems (the biological, psychological, or the social) is considered in isolation from the functioning of other subsystems" (Wangby, Bergman, & Magnuson, 1999, p. 880). Furthermore, "the holistic, integrated model for individual functioning and individual development does not imply that the

entire system of an individual must be studied in every research endeavor” (Bergman, Magnusson, & Khouri, 2003, p. 11). It is important, however, to consider more than one aspect or domain of individual functioning and to “measure key factors that together give information about the system(s) . . . and take into account that their joint operation may provide the key to understanding the system” (Bergman, 2001, p. 49).

The holistic-interactionistic framework posits that if the goal is to understand the complex associations among biological, mental, behavioral, and social factors, then these factors need to be integrated into a single, integrated model in which the total individual is the organizing principle (Magnusson, 2000). Moreover, theoretical models based on the holistic-interactionistic framework should supply an explanation of the bidirectional interaction between the individual and the environment and emphasize the interactive, often nonlinear character of the processes being examined (Magnusson, 2000).

The biopsychosocial model (a theoretical model based on the principles of the holistic-interactionistic framework) serves as the structure of the present study. The selection of measures for the present study was guided by the biopsychosocial model and other empirical research on risk factors. The model is described in the next section.

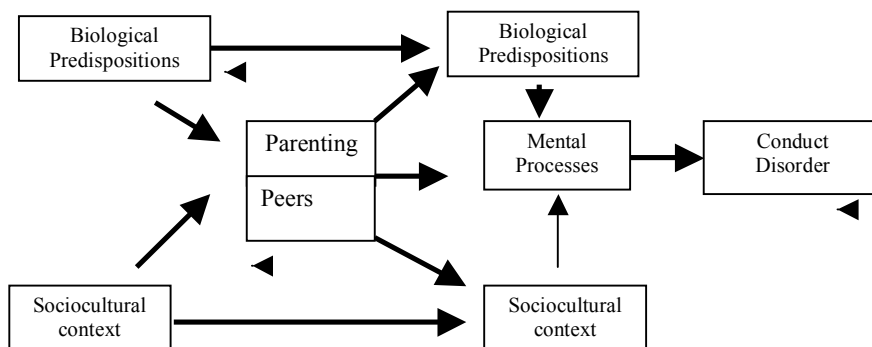
The Biopsychosocial Model of Conduct Disorder/Antisocial Development

The biopsychosocial model of conduct disorder synthesizes empirical predictors of antisocial development into an integrated, coherent model of how multiple predictors operate together to contribute to antisocial outcomes. The model is based on the premise that multiple factors contribute to antisocial outcomes (Dodge, 2000). These include biological, cognitive, and interpersonal factors. The model is guided by several propositions: “(a) nonlinear interactions among factors provide the most powerful

predictions; (b) life experiences mediate the effects of biological predispositions and sociocultural contextual factors; and (c) a common proximal mediator of all predictor variables is the child's acquired pattern of processing social information" (p. 350).

The model (see Figure 1) posits that there are varying paths to conduct problems (Dodge & Pettit, 2003). These paths are characterized as distal, proximal, and intervening. Distal mechanisms include biological predispositions, sociocultural contexts, and significant life experiences that place children at risk in early life. Proximal mechanisms include cognitive and emotional processes that occur during social exchanges. Intervening factors include life experiences with parents, peers, and social institutions. These intervening factors either increase or mediate risks imposed by the distal mechanisms of biological predispositions and sociocultural contexts.

Figure 1. Biopsychosocial model of conduct disorder/antisocial development



Source: Dodge & Pettit, 2003, p. 351

The developmental model unfolds as follows (Dodge, 2000; Dodge & Pettit, 2003). First, it appears that because of genes or in utero experiences, some children are

born with neural, endocrine, and psychophysiological vulnerabilities, or are born into a sociocultural context (e.g., poverty, unemployment, parental criminality, or substance abuse) that places them at risk for later conduct problems. These paths—biological and sociocultural—are likely to be indirect, and could lead to many outcomes. Second, these distal factors tend to lead some children to life experiences with parents, peers, and schools that place them at risk for conduct problems. These distal factors could lead to life experiences with parents that are inconsistent, harsh, inflexible, or rigidly disciplinarian. There could be lack of warmth between parent and child, or a lack of supervision and monitoring. Distal factors also could lead to life experiences with peers that include high levels of exposure to aggressive peers in day care or preschool settings during early childhood, or to social rejection by peers in elementary school, or to association with deviant peers during adolescence. It is also possible that these distal factors could lead to life experiences in school that may include early school failure or early grade retention (Dodge, 2000; Dodge & Petit, 2003).

In short, “the child’s neural and psycho-physiological functioning, sociocultural context, and life experiences will recursively iterate in ways that either exacerbate or diminish antisocial development” (Dodge & Petit, 2003, p. 360). Through recursive iterations across development, these reciprocally influencing factors either exacerbate or diminish antisocial behaviors. These factors are correlated with one another, mediate one another, and may even cause one another across time (Dodge, 2000; Dodge & Petit, 2003).

The distal factors of biological predispositions, sociocultural context, and life experiences lead to antisocial development through the mediating mechanisms of

cognitive and emotional processes. Dodge and Pettit (2003) offer three propositions as to how these distal factors relate to mediating proximal mechanisms to produce antisocial outcomes. First, they hypothesize that children develop and acquire social knowledge about their world via biological predispositions, sociocultural context, and life experiences. Second, in social situations children use their acquired social knowledge to guide the processing of social information and cognitive-emotional processes, which in turn determines their response to social cues. Third, children's processing patterns lead directly to specific prosocial or antisocial behaviors and mediate the effects of biological predispositions, sociocultural context, and early life experiences on later antisocial behaviors.

The biopsychosocial model not only provides a framework for explaining problem behaviors such as serious substance use and delinquency but also provides a basis for identifying key risk mechanisms and for guiding the design of interventions for youths with delinquency or substance-related problems or for youths with co-occurring problems of delinquency and substance use. A theory of intervention provides guidance and direction for intervening to solve a problem (Roberts-Levine, 2006). To guide interventions and practice, theories should (a) identify the factors that predict or are associated with drug abuse and serious delinquency; (b) explain the mechanisms and processes through which the factors operate; (c) identify the factors or markers that influence these mechanisms; (d) predict points to interrupt the course leading to substance abuse and serious delinquency; and (e) specify the interventions to prevent onset of and to reduce substance abuse and serious delinquency (Hawkins, Catalano, & Miller, 1992).

On the basis of this model, Dodge and Pettit (2003) outline implications for interventions. First, because antisocial behaviors are correlated with other problem behaviors, successful interventions will require addressing multiple risk factors and multiple outcomes at the same time, which in turn will require multicomponent interventions. Second, because development operates through psychological processes and life experiences with parents, peers, and schooling, interventions should address these domains.

In the present study, multiple risk factors and multiple outcomes were examined concurrently. Given the goals of the study, the structural relationships hypothesized by the biopsychosocial model were not tested. However, key constructs of the model were examined, including life experiences with parents/family, peers, and schooling. The measures for each of these constructs are described in the next chapter.

CHAPTER 4

METHODS

This study is exploratory and cross-sectional, and based on a secondary data analysis. The data analyzed in the present study were collected as part of a larger study designed to evaluate interventions at Samarkand Youth Development Center. Cases and data for the present study were drawn from Samarkand Youth Development Center, the research site for the larger evaluation study. Samarkand Youth Development Center is one of five youth development centers in North Carolina and the only facility that houses girls aged 10–18 who have committed a criminal offense. Samarkand Youth Development Center provides education, treatment, and rehabilitative programs to female juvenile offenders.

The primary research questions addressed in the study are:

1. What is the extent of substance use disorders and of co-occurring substance use and mental health disorders in a sample of female juvenile offenders?
2. Do the psychosocial profiles of female juvenile offenders with and without a substance use disorder differ, as measured by the Multidimensional Adolescent Assessment Scale?
3. Are there distinct psychosocial risk profiles in a sample of female juvenile offenders? If so, do the subgroups of female juvenile offenders with distinct psychosocial risk profiles differ as a function of the demographic characteristic of race and the

background characteristic of a *DSM-IV-TR* diagnosis of an alcohol- or substance use disorder?

Procedure

Upon entry to Samarkand Youth Development Center, as part of the assessment process, each student is given a battery of standardized assessments and questionnaires (e.g., physical health, mental health, and substance abuse) to complete. Data obtained from standardized assessments and questionnaires were stored in the Residential Substance Abuse and Treatment (RSAT) database. In addition, data obtained from Samarkand Institutional Files and North Carolina Department of Juvenile Justice and Prevention were stored in the RSAT database. Data include demographic, social, and offense history profiles, psychological assessments, juvenile detention and youth academy admission and discharge history, and the North Carolina Department of Juvenile Justice and Delinquency Prevention Risk and Needs Assessment.

Sample

Cases in the RSAT database included all adolescent females aged 10–18 who were committed to Samarkand Youth Development Center between February 21, 2002, and June 1, 2006. There were a total of 218 cases during this period. However, 15 of those cases included girls who were recommitted to Samarkand Youth Development Center. Because of duplication, those cases were eliminated, resulting in a final sample of 203 cases. The demographics of the sample are presented in Table 1. The average age of the girls in the sample was 15 ($M = 14.93$, $SD = 1.00$). On average, the girls in the sample had three prior adjudications ($M = 2.74$, $SD = 1.6$) and one prior commitment to a youth

Table 1

Demographics of Sample (N= 203)

Variable	African American		Whites		Others		Total	
	N	%	N	%	N	%	N	%
Race	143	70%	50	25%	10	5%	203	100%
Age								
12	3	2%	0	0%	1	10%	4	2%
13	8	6%	4	8%	0	0%	12	6%
14	31	22%	10	20%	1	10%	42	21%
15	61	43%	23	46%	5	50%	89	44%
16	34	24%	12	24%	3	30%	49	24%
17	4	3%	1	2%	0	0%	5	3%
Most serious prior offense								
Misdemeanor	42	46%	10	26%	4	67%	56	42%
Nonviolent Felony	42	46%	26	68%	1	17%	69	51%
Violent Felony	7	8%	2	5%	1	17%	10	7%
Prior adjudications								
None	7	6%	3	7%	0	0	10	5%
One or two	52	43%	23	58%	2	25%	77	45%
Three or more	62	51%	18	41%	6	75%	86	50%
Family with criminal history								
Yes	64	70%	27	71%	0	0	91	72%
No	27	30%	11	29%	6	100%	44	28%

Note. Many of the variables had missing values. The valid percentages are reported.

development center ($M = 1.13$, $SD = .36$). Sixty-nine percent had a *DSM-IV-TR* diagnosis of an alcohol- or substance-related disorder (abuse or dependence). Sixty percent lived in a single family household; 72% originated from families with criminal histories. In terms of race, the majority of the sample was African American (70%); 25% was White, and 5% was designated as “other.”

Instruments

As noted previously, upon entry to Samarkand Youth Development Center, as part of the assessment process, each student is given a battery of standardized assessments and questionnaires to complete. Data from the Multidimensional Adolescent Assessment Scale, Problem Oriented Screening Instrument for Teenagers, and psychological assessments were used in the present study. The scales and the selected measures from each scale are described below.

Multidimensional Adolescent Assessment Scale (MAAS)

This instrument is a self-report tool designed to evaluate a youth’s personal and social functioning. Scores are generated across 16 domains: depression, self-esteem, problems with mother, problems with father, personal stress, problems with friends, problems with school, aggression, family-relationship problems, suicidal thoughts, feelings of guilt, confused thinking, disturbing thoughts, memory loss, alcohol abuse, and drug use. The composite scores for the subscales range from 0 to 100, with higher scores indicating greater problems in the respective domain of functioning. The estimated clinical cutoff score is 30 for 12 of the subscales. For the subscales of aggression, alcohol abuse, and drug abuse, however, the estimated clinical cut off score is 15, and 10 is the clinical cutoff score for the subscale of suicidal thoughts. Previous studies established

reliability scores through the coefficient alpha (Mathiesen, Scottye, & Hudson, 2002).

The coefficient alphas for 15 of the subscales range from .83 to .96. The coefficient alpha for depression is .77, which is still moderately high.

Problem Oriented Screening Instrument for Teenagers (POSIT).

The POSIT is a self-report tool designed to evaluate a youth's level of functioning. Scores are generated across 10 domains, including substance use/abuse, physical health, mental health, family relationships, peer relations, educational status, vocational status, social skills, leisure and recreation, and aggressive/delinquent behavior. A previous study found strong support for the criterion validity of the POSIT, strong convergent validity for the Substance Use, Mental Health, and Aggressive Behavior/Delinquency domains, and some support for convergent validity for the domains of Physical Health, Family Relations, Educational Status, and Social Skills (Hall, Richardson, Spears, & Rembert, 1998).

Psychological Assessment

This assessment is based on the *DSM-IV-TR*, which classifies mental and substance use disorders.

Measures

Antisocial Outcomes

Alcohol and Substance Use. MAAS Alcohol Abuse consists of 15 items rated on a 7-point scale (1= *none of the time*, 4=*some of the time*, 7=*all of the time*). The coefficient alpha is .94. MAAS Drug Use consists of 10 items rated on a 7-point scale (1= *none of the time*, 4=*some of the time*, 7=*all of the time*). The coefficient alpha is .94

Aggression. MAAS Aggression consists of 10 items rated on a 7-point scale (1= *none of the time*, 4=*some of the time*, 7=*all of the time*). The coefficient alpha is .86.

Disposition and Mental-Health Factors

Depression. MAAS Depression consists of 12 items rated on a 7-point scale (1= *none of the time*, 4=*some of the time*, 7=*all of the time*). The coefficient alpha is .77.

Life Experiences: Parenting/Family

Parenting and Family Relationships. POSIT Family Relationship consists of 11 items that screen for problems with the adolescent's relationships with parents or guardians. It includes questions about the general family atmosphere and parenting practices. MAAS Problems With Mother consists of 12 items rated on a 7-point scale (1= *none of the time*, 4=*some of the time*, 7=*all of the time*). The coefficient alpha is .89. MAAS Family Relationship Problems consists of 13 items rated on a 7-point scale (1= *none of the time*, 4=*some of the time*, 7=*all of the time*). The coefficient alpha is .92.

Life Experiences: Peers

Peer Relationships. MAAS Problems With Friends consists of 13 items rated on a 7-point scale (1= *none of the time*, 4=*some of the time*, 7=*all of the time*). The coefficient alpha is .92. POSIT Peer Relationships screens for problems due to negative influences and negative behaviors by the youth's peers, such as truancy, property damage, and theft.

Life Experiences: Schooling

School/Education. MAAS Problems With School consists of 10 items rated on a 7-point scale (1= *none of the time*, 4=*some of the time*, 7=*all of the time*). The coefficient alpha is .85. POSIT Educational Status screens for learning disabilities or academic underachievement due to problems with cognitive functioning.

Statistical Analyses

For the current study, a variety of statistical analyses were conducted to address the three research questions: descriptive, chi-square, profile, and latent profile analyses.

The analyses for each question are as follows:

Research Question 1

Research Question 1 was *What is the extent of substance use disorders and of co-occurring substance use and mental health disorders among the sample?* To address this question, prevalence rates for substance use and other mental-health disorders were computed using SPSS 12. Chi-square analyses were used to compare those rates by race,² and to compare rates of mental-health disorders between girls with and without a substance use disorder.

Research Question 2

Research Question 2 was *Do the psychosocial profiles of female juvenile offenders with and without a substance use disorder differ, as measured by the MAAS?* To address this question, profile analysis was conducted to compare female juvenile offenders with and without a substance use disorder on multiple subscales of the Multidimensional Adolescent Assessment Scale (MAAS). Profile analysis is the repeated measures extension of MANOVA in which a set of dependent variables are commensurate or all measured on the same scale. There is one major question examined by profile analysis: Do groups have similar profiles on a set of dependent variables? Other questions for profile analysis include the following: Does one group, on average, score higher on the collected set of measures than another? Do all the dependent variables

² Given the small number of females designated as “other,” those designated as “other” were not included in chi-square analyses.

elicit the same average response? The latter question is relevant only if the profiles are parallel.

Profile analysis was performed on 16 subscales of the MAAS: depression, self-esteem, problems with mother, problems with father, personal stress, problems with friends, problems with school, aggression, family relationship problems, suicidal thoughts, feelings of guilt, confused thinking, disturbing thoughts, memory loss, alcohol abuse, and drug use. The grouping variable was *DSM-IV-TR* diagnosis, divided into female juvenile offenders with an alcohol- or substance use disorder and female juvenile offenders without an alcohol-substance use disorder.

Prior to conducting the profile analysis, diagnostic procedures (using SPSS 12) were performed on the 16 subscales of the MAAS to test for missing data, multivariate normality, outliers, homogeneity of variance-covariance matrices, linearity, and the absence of multicollinearity. The variables were examined separately for the 139 girls with a *DSM-IV-TR* alcohol- or substance use disorder and the 64 girls without a *DSM-IV-TR* alcohol- or substance use disorder.

Of the 139 girls with a substance use disorder, 32(23%) had missing values on the problems with father variable, and 2(1.4%) had missing values on the problems with mother variable. Of the 64 girls without a substance use disorder, 9(14%) had missing values on the problems with father variable, 3(5%) had missing values on the problems with father variable, and 1(2%) had missing values on the family relationship problems variables. Missing values on the problems with father, problems with mother, and problems with family relationships variables were imputed using the EM algorithm through SPSS MVA after finding no statistically reliable deviation from randomness

using Little's MCAR test, $p = .373$. In essence, the missing values on the respective variables were found to be missing completely at random. Missing values are said to be missing completely at random when they are not randomly distributed across all observations, and when the probability of missing values on any of the independent variables does not depend on the values of the dependent variable (Kolb & Dayton, 1996).

By using Mahalanobis distance with $p < .001$, 10 cases (9 cases in the substance use disorder group, and 1 case in the without substance use disorder group) were identified as multivariate outliers. Two cases with univariate outliers were also identified. In profile analysis, an outlier can produce either a Type I or Type II error, with no indication as to which is occurring (Tabachnick & Fidell, 2001), making it highly sensitive to outliers. Given this, the 12 outliers were deleted. With multivariate outliers deleted, 129 cases remained in the substance use disorder group, and 62 cases remained in the nonsubstance use disorder group. The assumption of homogeneity of covariance matrices was checked using the Box test. Because the Box test was significant beyond the .01 level ($F = 2.583$, $p < .001$), and because there were sharply unequal n 's between the two groups, Pillai's Trace criterion was used. Pillai's Trace test statistic is robust and more appropriate when there are small or unequal sample sizes and when there are violations against the homogeneity of covariance matrices (Stevens, 2001). Because profile analysis is robust to violation of normality and because there were more cases in the smallest group ($n = 62$) than dependent variables (16), deviation from normality was not expected (Tabachnick & Fidell, 2001). In addition, the absence of multicollinearity was met.

Research Question 3

Research Question 3 was *Are there distinct psychosocial risk profiles in a sample of female juvenile offender? If so, do the subgroups of female juvenile offenders with distinct psychosocial risk profiles differ as a function of the demographic characteristic of race and the background characteristic of a DSM-IV-TR diagnosis of an alcohol-or substance use disorder?*

Latent profile analysis was conducted to determine if there were distinct psychosocial profiles in the sample based on 12 variables: depression, problems with mother, problems with father, problems with friends, problems with school, aggression, family relationship problems, alcohol use, drug use, family relationships, peer relations, and educational status. Latent profile analysis is a variant of latent class analysis in which a set of continuous indicator variables are used to construct latent classes (i.e., classes that are not observed directly). Unlike profile analysis, in latent profile analysis groups or classes are not known a priori. And, unlike profile analysis, in latent profile analysis there are no assumptions of linearity, normal distribution of data, and homogeneity of variances (McCutcheon, 1987). Latent class analysis is similar to cluster analysis in terms of classifying similar objects or persons into groups. However, it is distinguished from cluster analysis in that it is based on a model-based approach, meaning that a statistical model is postulated to be generated for the population under study (Magdison & Vermunt, 2002). A major advantage of a statistical modeling approach is that the choice of the clustering criterion is less arbitrary (Magdison & Vermunt).

In latent profile analysis, a separate set of means, variances, and covariances for each latent class is estimated. Thus, one of the major objectives of this type of analysis is

finding latent classes that differ in terms of their means (Vermunt & Magdison, 2002). For the current study, the latent profile analyses-derived classes reflect differences in levels or severity of psychosocial functioning.

Models for the latent profile analysis were estimated with the latent variable software Mplus, Version 4.0 (Muthén & Muthén, 2004). Because relatively small sample sizes and large numbers of response items generate sparse tables (Eid, Langehein, & Deiner, 2003), bootstrapping, using the maximum of the likelihood ratio estimator, was employed. This estimator was used because it allows for missing data under missing-at-random assumptions (Little & Rubin, 1987). The analysis was conducted with the “missing” option, allowing all observations in the data set to be used in estimating the parameters. Two to five classes were estimated, and each class was estimated using 500 replication samples. Each class was evaluated using multiple criteria: the Lo-Mendell-Rubin (LMR) test, the bootstrap likelihood ratio test (BLRT), and the fit indices of Bayesian Information Criteria (BIC) and entropy values. With the LMR test, a model with K classes can be compared to a model with $(K+1)$ classes. The LMR test generates a p -value that can be used to determine if there is a statistically significant improvement in fit for the inclusion of a model with one more class (Nylund, Asparouhov, & Muthén, 2006, p. 5). Similarly, the BLRT can be used to compare sequential models with K versus $(K + 1)$ classes. The BIC and entropy values are model fit statistics. The BIC is a global measure of parsimony that weighs the fit and parsimony of the model; the lower the BIC, the better the model. And, entropy values measure how well the latent classes can be distinguished (Muthen, 2006). Values range from 0 to 1, and high entropy values (i.e., closer to 1.00) are indicative of a good fitting model.

Handling of Missing Data

SPSS MVA (Missing Values Analysis) was used to determine patterns of missing values in the data set, and, in some instances, was used to replace missing values in the data set. As stated previously, prior to conducting the profile analysis, all measures of the MAAS were examined for missing values; problems with father, problems with mother, and problems with family relationships variables were imputed using the EM algorithm through SPSS MVA. These measures, with their imputed values, in addition to other selected measures of the MAAS and POSIT, were included in the latent profile analysis. Eleven cases had missing data on the POSIT measures. Because of computer problems, data values on the POSIT measures were lost, indicating that the “mechanism for missingness” appeared to be missing completely at random. If data are missing completely at random, the maximum likelihood estimation ignoring the missing data mechanism can be used. This strategy for working with missing values, which computes the parameter estimates of the model of interest by maximizing the incomplete data log-likelihood function, produces more accurate estimates than list-wise deletion, pair-wise deletion or imputation using the EM algorithm (Acock, 2005). As stated previously, this strategy was used in the latent profile analysis. Because the maximum likelihood estimation is not an option in the SPSS program, the EM algorithm strategy was used to handle missing data in the profile analysis.

Many cases in the data set had missing values on the demographic variables: 31(15%) of the cases had missing values on the prior number of adjudications variable; 33(16%) had missing values on the age at first referral variable; 32(16%) had missing values on the prior commitment variable; and 69(34%) had missing values on the single

parent household, criminal family, and most serious prior offense variables. These variables were used for descriptive purposes (i.e., to describe the total sample and to describe the latent classes generated by the latent profile analysis) and were not included as indicator variables or covariates in the latent profile analysis. As such, valid percentages, which do not include missing values, were reported for each of these variables. The variables of race and *DSM-IV-TR* diagnosis of an alcohol- or substance use disorder, which were used as covariates in the latent profile analysis, did not have any missing values.

Conclusion

In short, a variety of analytic approaches were used in the present study to examine the psychosocial risk profiles of serious female juvenile offenders: descriptive, chi-square, profile, and latent profile analyses. Descriptive and chi-square analyses were used to answer the first research question: What is the extent of substance use disorders and of co-occurring substance use and mental-health disorders in a sample of female juvenile offenders? Profile analysis was used to answer the second research question: Do the psychosocial profiles of female juvenile offenders with and without a substance use disorder differ? And, latent profile analysis was used to answer the third research question: Are there distinct psychosocial risk profiles in a sample of female juvenile offender? If so, do the subgroups of female juvenile offenders with distinct psychosocial risk profiles differ as a function of the demographic characteristic of race and the background characteristic of a *DSM-IV-TR* diagnosis of alcohol- or substance use disorder? The results of these analyses are presented in the subsequent chapter.

CHAPTER 5

RESULTS

The results of the statistical analyses conducted to address the research questions of the present study are presented in this chapter. The results for each question are presented separately below.

Research Question 1

Prevalence Rates of Substance Use Disorders

Among the sample, 69% met *DSM-IV-TR* criteria for an alcohol- or substance-related disorder. Of those with an alcohol- or substance-related disorder, 79% met the criteria for cannabis-related disorders; 38% met criteria for alcohol-related disorders; 14% met criteria for cocaine-related disorders; 14% met criteria for polysubstance-related disorders; 2% met criteria for sedative/hypnotic/anxiolytic disorder, and 1% met criteria for amphetamine- and hallucinogen-related disorders, respectively. Of those who met criteria for an alcohol-related disorder, 85% also met criteria for a cannabis-related disorder, and 21% also met criteria for a cocaine-related disorder. Of those who met criteria for a cannabis-related disorder, 15% also met criteria for a cocaine-related disorder.

Racial Differences in Prevalence Rates of Substance Use Disorders

In terms of racial differences related to the prevalence rates of substance use disorder, 65% of African American girls compared with 78% of White girls in the sample

met criteria for an alcohol- or substance-related disorder. These rates were not significant. Rates of alcohol-related disorders among African American (25%) and White (24%) girls were similar. Rates of cannabis-related disorders among African American (58%) and White (42%) girls were significantly different; significantly more African American girls had a cannabis-related disorder $X^2(1, N = 132) = 23.10, p < .01$. Rates of cocaine and polysubstance-related disorders among African American (6% and 1%, respectively) and White (34% and 18%, respectively) girls were significantly different. Significantly more White girls had a cocaine-related disorder $X^2(1, N = 132) = 5.13, p < .05$, and a polysubstance-related disorder $X^2(1, N = 132) = 38.29, p < .01$.

Prevalence Rates of Mental Health Disorders

With regard to other mental-health disorders, 81% of the sample met criteria for a conduct disorder, 37% for a mood disorder; 21% met criteria for an attention deficit hyperactivity disorder; 8% met criteria for a learning disorder; 6% met criteria for an anxiety disorder; 5% met criteria for an oppositional defiant disorder, and 3% met criteria for an adjustment disorder. There were significantly more White (52%) than African American girls (32%) with a mood disorder $X^2(2, N = 193) = 6.23, p < .05$. There were no significant differences between White and African American girls in the rates of anxiety disorders (10% compared to 6%), conduct disorders (74 % compared to 84%), adjustment disorders (4% compared to 2%), attention deficit hyperactivity disorder (22% compared to 22%), oppositional defiant disorders (4% compared to 5%), or learning disorders (8% compared to 7%).

Prevalence Rates of Co-occurring Disorders

Among those with a substance use disorder, 80% also met criteria for a conduct disorder; 35% met criteria for a mood disorder; 20% met criteria for an attention deficit/hyperactivity disorder; 7% met criteria for a learning disorder; 6% met criteria for an anxiety disorder, and 5% met criteria for an oppositional disorder. There were no significant differences between those with and without a substance use disorder of meeting criteria for a conduct disorder, anxiety disorder, adjustment disorder, attention deficit hyperactivity disorder, oppositional defiant disorder, or learning disorder.

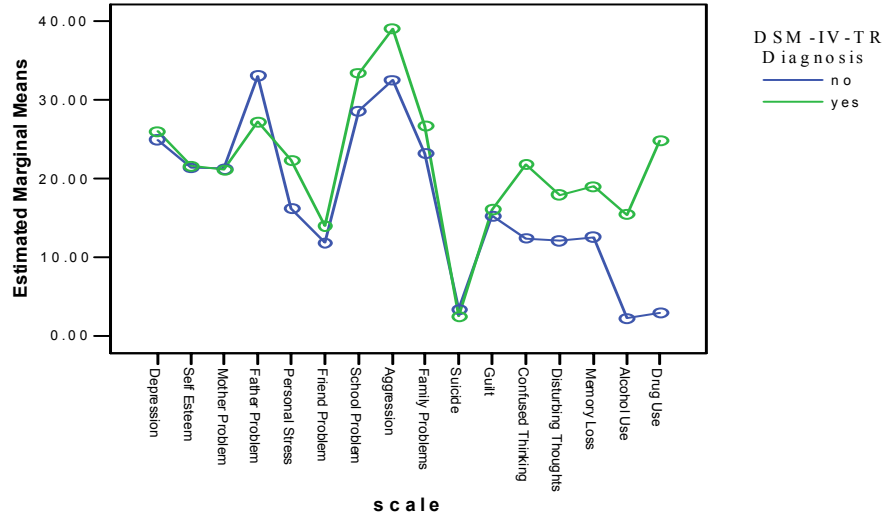
Chi-square analyses revealed that African American girls (90%) had a higher prevalence of co-occurring substance use and conduct disorders than White girls (71%), $X^2(1, N = 125) = 6.810, p < .01$. White and African American girls did not differ on any other co-morbid disorders.

Research Question 2

Prior to conducting the major analysis, chi-square analysis was conducted to determine if there were differences between female juvenile offenders with and those without a substance use disorder on demographic and background variables. No significant differences were found between those with and those without a substance use disorder on the demographic variables of age and race. There were no significant differences between those with and those without a substance use disorder on the background variables of prior adjudications, single parent household, urban resident, prior commitments (i.e., incarceration) or most serious prior offense.

SPSS GLM was used for the major analysis. Using Pillai's Trace criterion, the profiles, seen in Figure 2, deviated significantly from parallelism, $F = (15, 175) = 3.9$,

Figure 2. Profiles of MAAS scores



($P < .001$). That is, girls with and without a substance use disorder had significantly different profiles on the MAAS. For the levels test, reliable differences were found between the groups when scores were averaged over all 16 subtests, $F(1, 189) = 9.733$, $P > .005$. In other words, on average, girls with a substance use disorder had reliably higher scores on the collected set of MAAS subscales than girls without a substance use disorder.

The means, standard errors, and pooled confidence intervals of each group are reported in Table 2. To evaluate deviation from parallelism of the profiles, confidence limits were calculated around the mean of the profile for the two groups combined. Confidence limits of 95% were evaluated for the pooled profile. For six of the subscales, both groups had means that fell outside these limits. Girls without a substance use disorder had a reliably lower mean on the personal stress subscale ($M = 16.20$) than that of the pooled groups (where the 95% confidence limits were 16.32–22.34), whereas girls

Table 2

MAAS Scores for Nonsubstance Use Disorder and Substance Use Disorder Groups

DSM-IV-TR Alcohol-or Substance Related Disorder	Subscale	Mean	Standard Error	95% Pooled Confidence Interval	
				Lower Bound	Upper Bound
No	Depression	24.977	1.932	23.230	27.868
	Self-Esteem	21.420	1.786	19.462	23.749
	Mother Problem	21.249	2.954	17.714	24.805
	Father Problem	33.075	2.621	27.085	33.375
	Personal Stress	16.196	2.548	16.319	22.434
	Friend Problem	11.869	2.016	10.119	14.958
	School Problem	28.620	2.398	28.084	33.839
	Aggression	32.527	2.737	32.831	39.400
	Family Problems	23.200	2.804	21.640	28.371
	Suicide	3.397	.966	1.810	4.129
	Guilt	15.280	2.189	13.069	18.322
	Confused Thinking	12.434	2.727	13.890	20.434
	Disturbing Thoughts	12.149	2.703	11.871	18.359
	Memory Loss	12.601	2.381	12.996	18.710
	Alcohol Use	2.266	1.942	6.577	11.238
	Drug Use	2.957	2.771	10.658	17.309
Yes	Depression	26.120	1.340	23.230	27.868
	Self-Esteem	21.791	1.238	19.462	23.749
	Mother Problem	21.270	2.048	17.714	24.805
	Father Problem	27.384	1.817	27.085	33.375
	Personal Stress	22.557	1.766	16.319	22.434
	Friend Problem	13.208	1.398	10.119	14.958
	School Problem	33.303	1.662	28.084	33.839
	Aggression	39.704	1.897	32.831	39.400
	Family Problems	26.810	1.944	21.640	28.371
	Suicide	2.542	.670	1.810	4.129
	Guilt	16.111	1.517	13.069	18.322
	Confused Thinking	21.890	1.890	13.890	20.434
	Disturbing Thoughts	18.081	1.874	11.871	18.359
	Memory Loss	19.105	1.651	12.996	18.710
	Alcohol Use	15.549	1.346	6.577	11.238
	Drug Use	25.009	1.921	10.658	17.309

with a substance use disorder had a reliably higher mean on the personal stress subscale than that of the pooled groups ($M = 22.56$); girls without a substance use disorder had a reliably lower mean on the aggression subscale ($M = 32.53$) than that of the pooled groups (95% confidence limits were 32.83–39.40), whereas girls with a substance use disorder had a reliably higher mean on the aggression subscale ($M = 39.70$). Girls without a substance use disorder had a reliably lower mean on the confused-thinking subscale ($M = 12.43$) than that of the pooled groups (95% confidence limits were 13.89–20.43); however, girls with a substance use disorder had a reliably higher mean on the confused thinking subscale than that of the pooled groups ($M = 21.89$). Girls without a substance use disorder had a reliably lower mean on the memory loss subscale ($M = 12.60$) than that of the pooled groups (95% confidence limits were 13.00–18.71), whereas girls with a substance use disorder had a reliably higher mean ($M = 19.11$) on this subscale. Not surprisingly, girls without a substance use disorder had reliably lower means on the respective alcohol-use ($M = 2.27$) and drug-use subscales ($M = 2.96$), whereas girls with a substance use disorder had reliably higher means on the alcohol use ($M = 15.55$) and drug use ($M = 25.01$) subscales (95% confidence limits were 6.58–11.33 for alcohol abuse, and 10.66–17.31 for drug use).

Research Question 3

Prior to conducting the latent profile analysis, correlational coefficients were computed among the 12 psychosocial subscales to assess the degree to which they were linearly related. The results of the correlational analyses presented in Table 3 show that there were modest correlations between the depression subscale and the subscales of problems with mother, problems with friends, problems with school, aggression, family

relationship problems, alcohol use, and drug use. There were modest correlations between the subscales of problems with mother and aggression, problems with mother and problems with school, and a moderate correlation between problems with mother and family relationship problems. The correlations between aggression and the subscales of family relationship problems, alcohol use, and drug use were modest. There were moderate correlations between alcohol use and drug use, drug use and peer relations (i.e., association with deviant peers) and peer relations and educational status (i.e. academic underachievement). The subscale of problems with father was correlated only with the one subscale: relationship with family (i.e., family atmosphere/parenting practices). In general, higher depression and family relationship problems scores were associated with low bonding to school (i.e., problems with school scale) and the antisocial behaviors of aggression, drug use, and alcohol use. Higher peer relations scores (i.e., association with deviant peers) were associated with family relationship problems, academic underachievement (i.e., educational status subscale) and the antisocial behaviors of drug use, and alcohol use.

Latent profile analysis was conducted to determine if there were distinct psychosocial risk profiles among the sample. The preliminary analysis revealed that the subscale of problems with father did not discriminate well across classes. Consequently, this measure was dropped from final analyses. The final model, which included 11 psychosocial variables, is shown in Figure 3.

Table 3

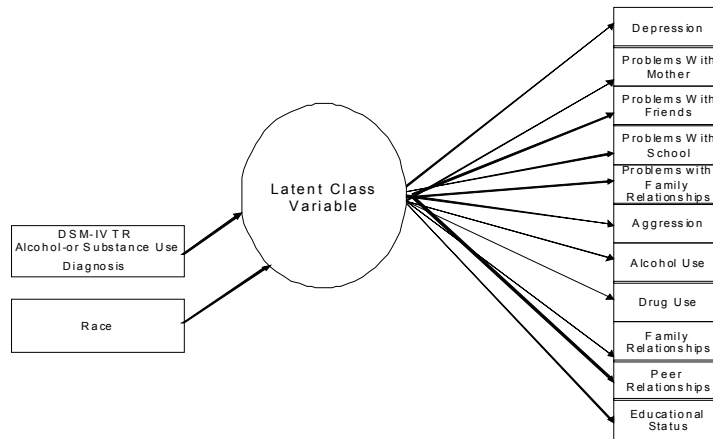
Correlations Among Psychosocial Factor Scales

Risk Factor Scale	Depression	Problems with Mother	Problems with Father	Problems with Friends	Problems with School	Aggression	Family Relationship Problems	Alcohol Use	Drug Use	Relationship with Family (family atmosphere)	Peer Relations (deviant peers)	Educational Status
Depression	1.00	.236**	.022	.236**	.407**	.273**	.299**	.223**	.145*	.007	.098	.128
Problems with Mother	—	1.00	-.040	.104	.237**	.163**	.627**	.114	-.002	.059	.006	-.026
Problems with Father	—	—	1.00	.018	-.084	.082	.129	.062	-.038	.274**	.086	.067
Problems with Friends	—	—	—	1.00	.151*	-.005	.257**	0.33	.029	.089	.016	.061
Problems with School	—	—	—	—	1.00	.298**	.229**	.077	.109	-.020	.081	.164*
Aggression	—	—	—	—	—	1.00	.185**	.195**	.163**	.016	.064	.138
Family Relationship Problems	—	—	—	—	—	—	1.00	.167**	.116	.211**	.065	-.010
Alcohol Use	—	—	—	—	—	—	—	1.00	.651**	.073	.369**	.252**
Drug Use	—	—	—	—	—	—	—	—	1.00	.084	.458**	.276**
Relationship with Family (family atmosphere)	—	—	—	—	—	—	—	—	—	1.00	.360**	.212**
Peer Relations (deviant peers)	—	—	—	—	—	—	—	—	—	—	1.00	.449**
Educational Status	—	—	—	—	—	—	—	—	—	—	—	1.00

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Figure 3. Latent class model



On the basis of the LMR test, the BLRT and the BIC, the model with four classes was selected as the best fitting model. The LMR and bootstrapped likelihood ratio tests were used to compare a model with K classes to a model with K-1 classes. Although in the current study, two through five classes were fitted to the model, it has been suggested that the first time the *p*-value of the LMR is nonsignificant that the researcher should stop increasing the number of classes (Nylund et al., 2006). In the current study, the first time the *p*-value of the LMR was nonsignificant was with a three-class solution. The LMR *p*-value of .24 suggested that a model with a two-class solution was sufficient relative to a three-class model. However, the *p*-value of the BLRT was less than .01, suggesting that a three-class solution may fit the data better than a two-class solution. The BLRT has been shown to be a more reliable tool for correctly determining the number of classes for latent class analysis (Eid et al., 2003; Nylund et al., 2006). Fit indices were also examined. In terms of the fit indices, the BIC improved progressively from a two-class solution (17387.540) to a four-class solution (17031.884), and worsened slightly with a five-class

solution (17060.086). With regard to the entropy value, the entropy value slightly declined from a two-class solution (.93) to a five-class solution (.90).

Because the model with a five-class solution had the highest BIC value and created a class that comprised only 1% of the sample, a class that was substantively and clinically uninformative, comparisons were made between a model with a three-class solution and a model with a four-class solution. While the statistical evidence did not point conclusively to a three-class solution over a four-class solution, examination of the classes revealed a small, but substantively and clinically informative class in the model with a four-class solution, leading to the selection of a four-class solution. The results of the latent class models, comparison of models, and associated statistics and significance levels are presented in Table 4.

Table 4

Model Fit for Tests of 2–5 Class Solutions

No. of classes	LMR Test	BLRT	BIC	Entropy Value
2	0.0086	0.0000	17387.540	0.93
3	0.1056	0.0000	17048.581	0.88
4	0.2185	0.0000	17031.884	0.90
5	1.0000	0.0000	17060.086	0.90

Class Membership

The analyses revealed that half (51%) of the sample was in Class I, with an average probability of .95; 18% of the population was in Class II, with an average probability of .97; 5% of the population was in Class III, with an average probability of .99; and 26% were in Class IV, with an average probability of .91. The mean for each subscale, standard error, and sample size for each latent class are illustrated in Table 5.

Table 5

Latent Psychosocial Profiles by Class

Subscale(s)	Class I Aggression Only (n= 104)		Class II Aggression & Drug Use (n= 37)		Class III Severe Alcohol & Drug Use (n= 10)		Class IV Family Conflict (n=52)	
	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error
MAAS								
Depression	19.15	2.139	33.15	2.442	38.08	5.025	33.40	2.301
Problems with Mother	10.66	1.346	22.14	4.553	31.13	9.852	36.06	4.797
Problems with Friends(peer acceptance/rejection)	8.55	1.472	12.97	3.614	17.40	8.521	20.34	3.222
Problems with School (low bonding or attachment to school)	26.40	2.571	35.47	3.023	44.68	7.699	39.72	3.428
Aggression	33.07	2.616	44.86	4.072	54.741	6.987	42.68	3.552
Problems with Family	12.15	1.545	27.04	4.158	41.410	7.801	47.78	5.097
Alcohol Use	4.06	.568	32.12	2.442	67.04	4.149	4.19	1.563
Drug Use	10.28	1.648	39.97	4.435	72.82	9.400	10.17	2.930
POSIT								
Family Relationships(family management and communication/parenting practices)	3.17	.316	3.48	0.395	5.00	1.156	4.13	0.631
Peer Relationships(deviant peer association)	4.20	.248	6.44	0.373	6.39	0.612	4.39	0.446
Educational Status (academic underachievement/ learning difficulties)	8.73	.554	11.21	0.850	14.47	1.687	8.40	0.758

Girls in Class I had clinically elevated scores on the MAAS subscale of aggression, subclinical scores on the MAAS subscales of depression, problems with mother, problems with friends, problems with school, family relationship problems, drug use and alcohol use, and middle-risk scores on the POSIT subscales of family and peer relationships and educational status. Because girls in Class I only reported clinically elevated problems related to aggression, this class was labeled *Aggression Only*. Girls in

Class II had clinically elevated scores on the MAAS subscales of depression, aggression, problems with school, alcohol use, and drug use; moderate-risk scores on the POSIT subscales of family relationships and educational status, and a high-risk score on the subscale of peer relationships. Although girls in this class had clinically elevated or high-risk scores on six subscales, they reported considerable problems related to aggression, drug use, and alcohol use. Because the highest scores were on the aggression and drug use scales this class was labeled *Aggression and Drug Use*. Girls in Class III had clinically elevated scores on the MAAS subscales of depression, problems with mother, family relationship problems, aggression, problems with school; extremely high clinically elevated scores on the MAAS subscales of alcohol and drug use; and high-risk scores on the POSIT subscales of educational status, and family and peer relationships. Class III was labeled *Severe Alcohol and Drug Use*. Girls in Class IV had clinically elevated scores on the MAAS subscales of depression, problems with mother, problems with school, aggression, and family relationship problems; subclinical scores on the subscales of alcohol use and drug use; and middle-risk scores on the POSIT subscales of educational status and family and peer relationships. Because girls in Class IV reported considerable family problems, this class was labeled *Family Conflict*.

Across all classes, girls had clinically elevated scores on the aggression subscale, but the scores differed in level of severity. Girls in the Aggression Only class had a mean score of 33.07; girls in the Aggression and Drug Use class had a mean score of 44.86; girls in the Severe Alcohol and Drug Use class had the highest elevated mean score of 54.74, and girls in the Family Conflict class had a mean score of 42.68. Moreover, across all classes, girls had subclinical scores on the subscale of problems with friends (i.e., peer

acceptance/rejection). Girls in the Aggression Only, Aggression and Drug Use, and Family Conflict classes had mean scores in the middle-risk category on the domain of family relationships (i.e., family atmosphere and parenting practices), whereas girls in the Severe Aggression and Drug Use class had a mean score in the high-risk category. Girls in the Aggression Only and the Family Conflict classes had mean scores in the middle-risk category on the domain of peer relationships (i.e., association with deviant peers), whereas girls in the Aggression and Drug Use and Severe Alcohol and Drug Use class had mean scores in the high-risk category. Girls in the Aggression Only, Aggression and Drug Use, and Family Conflict classes had mean scores in the middle-risk category on the domain of educational status, whereas girls in the Severe Alcohol and Drug Use class had a mean score in the high-risk category.

Across Classes II through IV, girls had scores in the clinical range on the depression subscale. Girls in these classes also had scores in the clinical range on the problems with school subscale. There were also differences across these three classes. Girls in the Aggression and Drug Use and Severe Alcohol and Drug Use classes (Class II and III) had clinically elevated scores on the subscales of alcohol use and drug use; however, girls in the Severe Alcohol and Drug class had scores that were in the extremely high clinical range. Girls in both classes also had high-risk scores on the domain of peer relationships (i.e., associating with deviant peers). Conversely, girls in the Family Conflict class (Class IV) had scores that were in the subclinical range on the subscales of alcohol use and drug use, and middle-risk scores on the domain of peer relationships. Girls in the Severe Alcohol and Drug and Family Conflict classes had scores that were in the clinical range on the subscales of problems with mother and family relationship

problems, whereas girls in the Aggression and Drug Use class had scores that were in the subclinical range on these two measures.

Covariates of Race and DSM-IV-TR Diagnosis of an Alcohol- or Substance use Disorder

The demographic variable of race and the background variable of a *DSM-IV-TR* diagnosis of an alcohol- or substance use disorder were included as covariates in the latent class analysis. The variable of race was not a significant predictor of class membership. Conversely, the background covariate of a *DSM-IV-TR* diagnosis of an alcohol- or substance use disorder (yes or no) was a significant predictor of latent class membership. Girls with an alcohol- or substance use disorder had a probability of .44, .23, .07, and .26 of being assigned respectively to Classes I (Aggression Only), II (Aggression and Drug Use), III (Severe Alcohol and Drug Use), and IV (Family Conflict). And, girls without a substance use disorder had a probability of .70, .00, .00, and .30 of being assigned respectively to Classes I, II, III, and IV.

Class Membership: Types of Substance use and Other Mental-Health Disorders

To further characterize the classes, the four classes were cross-tabulated with *DSM-IV-TR* criteria for alcohol, cannabis, cocaine, and polysubstance related disorders, and chi-squares tests were conducted to determine if there were significant differences across classes on these variables. As shown in Table 6, the rates of alcohol and polysubstance related disorders were significantly different across classes. Girls in the Aggression and Drug Use (41%) and Severe Alcohol and Drug Use (60%) classes had significantly higher rates of meeting criteria for alcohol related disorders, compared with girls in the Aggression Only (19%) and Family Conflict (21%) classes. Similarly, girls in the Aggression and Drug Use (24%) and the Severe Alcohol and Drug Use (40%) classes

had significantly higher rates of meeting criteria for polysubstance related disorders, than girls in the Aggression Only (4%) and Family Conflict (4%) classes. The rates of cannabis and cocaine related disorders were not significantly different across classes.

The classes were also characterized by rates of mental-health disorders, including conduct, mood, anxiety, attention deficit hyperactivity, oppositional defiant and learning disorders. The rate of meeting criteria for a diagnosis of a conduct disorder was significantly different across classes: girls in the Family Conflict class had the highest prevalence (92%), and girls in the Severe Alcohol and Drug Use class had the lowest prevalence (50%), $X^2(6, N = 203) = 19.646, p < .01$. The rates of mood, anxiety, attention deficit hyperactivity, oppositional defiant and learning disorders were not significantly different across classes.

Table 6

Substance Use Disorder by Latent Class

Substance use disorders	Class I Aggression Only (n= 104)		Class II Aggression & Drug Use (n= 37)		Class III Severe Alcohol & Drug Use (n= 10)		Class IV Family Conflict (n=52)		X^2	p-value
	n	%	n	%	n	%	n	%		
Alcohol	20	19	15	41	6	60	11	21	3	.004
Cannabis	55	53	21	57	5	50	29	56	3	.961
Cocaine	11	11	5	14	1	10	2	4	3	.423
Polysubstance	4	4	9	24	4	40	2	4	3	.000

Class Membership: Demographics and Offense Histories

The classes were further characterized by demographic and offense history characteristics, including single family household, family criminal history, adjudications, most serious prior offense (i.e., misdemeanor, felony, and violent felony), prior incarcerations, and current commitment offense. The four classes were cross-tabulated with the variables of single family household, family with a criminal history, and previous commitment (i.e., incarceration). Chi-square analyses revealed that there were no significant differences across the respective four classes in the rates of living in a single family household (65%, 54%, 50%, and 67%), having a family with a criminal history (72%, 82%, 75%, and 60%), and being committed previously to a youth development center (11%, 9%, 11%, and 7%).

Descriptive statistics revealed that the majority of the girls in the sample (49%) had three or more adjudications of delinquency, and that their most serious prior offense was categorized as a nonviolent felony (52%). Girls in the Severe Alcohol and Drug Use class had the highest rate of adjudications (i.e., three or more) followed by girls in the Aggression and Drug Use, Aggression Only, and Family Conflict classes. Although having a prior offense of a violent felony was relatively rare among the total sample (nearly 8%), girls in the Aggression Only and the Family Conflict classes had the highest prevalence (10%), whereas none of the girls in the Aggression and Drug Use and Severe Alcohol and Drug Use classes had a most serious prior offense of a nonviolent felony. Descriptive statistics also revealed that the majority of the girls in the sample were currently incarcerated for the commission of assault (22%) followed by assault with a deadly weapon (15%), felony larceny (15%), breaking and entering (7%), and possession

of stolen vehicle (5%). The majority of girls in the Aggression Only (18%), Aggression and Drug Use (24%), and Family Conflict (27%) classes were incarcerated for the commission of assault, whereas the majority of girls in the Severe Alcohol and Drug Use class (30%) were incarcerated for the commission of felony larceny.

Summary

In short, a variety of analytical approaches were used to answer the three research questions of the current study. Descriptive statistics revealed that nearly 70% of the sample met criteria for an alcohol- or substance use disorder. Profile analysis revealed that the psychosocial profiles of female juvenile offenders with and without a substance use disorder differed; female juvenile offenders with a substance use disorder exhibited more psychosocial problems. Latent profile analysis revealed four distinct psychosocial risk profiles among the sample: Aggression Only, Aggression and Drug Use, Severe Alcohol and Drug Use, and Family Conflict. Girls in the Aggression Only class had the lowest level of problem severity, and the highest level of psychosocial functioning. Conversely, girls in the Severe Alcohol and Drug Use class had the highest level of problem severity and the lowest level of psychosocial functioning. Of the 11 subscales measured, girls in this class had scores on 10 of the subscales that were in the clinical range or high-risk category. Girls in the Aggression and Drug Use class had the second highest level of problem severity; they had scores on six subscales that were in the clinical range or high-risk category. And girls in the Family Conflict class had the highest level of family conflict. They had the highest clinically elevated scores on the subscales of problems with mother and family relationship problems. These findings are discussed

in more detail in the subsequent chapter. Implications of these findings are discussed as well in the following chapter.

CHAPTER 6

DISCUSSION AND IMPLICATIONS FOR SOCIAL WORK PRACTICE

One of the aims of the present study was to estimate the prevalence of substance use disorders, and co-occurring substance use and mental-health disorders in the sample. In the sample, 69% met criteria for a *DSM-IV-TR* diagnosis of an alcohol- or substance-related disorder. This finding was within the range (60–87%) of previous research (Abrantes, Hoffman, & Anton, 2005; Potter & Jenson, 2003), and closely parallels the rate of 72% found in a study focusing specifically on incarcerated girls (Goldstein et al., 2003). Cannabis-related disorders were the most prevalent substance-related disorder followed by alcohol-related disorders. This finding is consistent with other studies conducted with samples of juvenile offenders (Lebeau-Craven et al., 2003; Potter & Jenson, 2003). Rates of cannabis-related disorders have also been found to be higher than rates of alcohol-related disorders in samples of youths in the general population (Young et al., 2002). Of those in the present study with an alcohol-related disorder, 85% also met criteria for a cannabis related disorder. This finding is consistent with another finding, demonstrating that most adolescents who abuse alcohol also abuse other illicit drugs, particularly marijuana (Martin et al., 1996).

Conduct disorders were the most prevalent *DSM-IV-TR* diagnoses, followed by substance-related disorders, mood disorders, attention deficit hyperactivity disorder, learning disorders, anxiety disorders, oppositional defiant disorders, and adjustment

disorders. Because many symptoms of conduct disorder are related to the behavior of delinquency, it is not surprising that conduct disorders were the most prevalent mental-health diagnoses found in the population.

Surprisingly, only 6% of the girls in the present study met criteria for an anxiety disorder. This was substantially lower than the prevalence of 18% (Timmons et al., 1997) and 57% (Goldstein et al., 2003) found in other samples of incarcerated girls. However, the difference in the rates of anxiety disorders across studies could be attributed to the different measures employed by researchers.

Although substance use and other mental-health disorders were evident across racial groups, White girls had a higher prevalence of mood disorders, cocaine-related disorders, and polysubstance-related disorders relative to African American girls. However, African American girls had a higher prevalence of cannabis-related disorders relative to White girls. Rates of co-occurring substance-related and mental-health disorders were similar between African American and White girls. There was, however, a pronounced difference between African American and White girls in the rate of co-occurring substance-related and conduct disorders. The prevalence was higher in African American girls. These differential findings may hold implications for the type of services and interventions that are provided to female juvenile offenders of different racial backgrounds.

Although the prevalence of co-morbid substance-related and conduct disorders was higher in African American girls, a substantial proportion of White girls with a substance-related disorder also met criteria for a conduct disorder. Across both racial groups, substance-related and conduct disorders were the most common co-occurring

disorders, followed by substance-related and mood disorders. It should be noted that conduct disorder was the most prevalent disorder in both substance-abusing and nonsubstance-abusing girls.

Conduct disorders and depression are the two most frequently reported disorders that co-occur with substance use disorders in populations of incarcerated adolescents (Mental Health America, 2000). These two disorders have also been found to be the most prevalent conditions that co-occur with substance use disorders in clinical, nonincarcerated female adolescents (Mezzich et al., 1995; Whitmore et al., 2000). Yet, treatment outcomes for adolescents with co-occurring disorders do not appear to be promising. For example, in their study conducted with a mixed gender sample of predominantly justice involved adolescents with a substance use disorder, Rowe et al. (2004) found that adolescents with co-occurring substance abuse and emotional or behavioral problems were more likely than their counterparts without co-occurring problems to be unresponsive to treatment, and to relapse in the year following treatment. Additionally, recovery time was longer for those with co-occurring substance abuse and behavioral problems than those without co-occurring behavioral problems (Rowe et al., 2004). Their findings also revealed the majority of girls in their study exhibited both co-morbid substance use and internalizing and externalizing disorders.

Other studies conducted with juvenile justice populations, particularly with samples of serious offenders, have found females to exhibit externalizing and internalizing symptoms equally (Cauffman, Piquero, Broidy, Espelage, & Mazerolle, 2004; Goldstein et al., 2003; Randall et al., 1999). Rowe et al.'s (2004) study also indicated that adolescents with co-morbid substance use and internalizing and

externalizing disorders were more likely to have a pattern of greater family dysfunction, and a family history of drug, mental-health, and legal problems than those with co-morbid internalizing or externalizing disorders. Substance-abusing adolescents with both internalizing and externalizing disorders showed slight reductions in their substance use between intake and discharge. These slight reductions, however, leveled off at 6 months, and levels of substance use returned to intake levels at the 12-month posttreatment period.

Findings of another study conducted with adolescents in three residential drug treatment programs revealed that adolescents with a combination of internalizing and externalizing disorders entered treatment with the highest levels of substance-related problems compared to those with no co-morbid disorder or those with only an internalizing or externalizing disorder (Shane, Jasiukaitis, & Green, 2003). Moreover, despite improvement over the course of treatment, those with combined internalizing and externalizing disorders remained at the most elevated problem levels at the posttreatment period, as compared to those without a co-morbid disorder and those with either an internalizing or externalizing disorder (Shane, Jasiukaitis, & Green, 2003).

Surprisingly, in the current study, there were no differences between those with and those without a substance- or alcohol-related disorder in rates of meeting criteria for other mental-health disorders. This finding is inconsistent with the findings of Milin et al.'s (1991) study that was conducted with a mixed gender sample of juvenile offenders. Milin et al.'s study revealed that incarcerated juveniles with a *DSM-III* diagnosis of substance abuse or alcohol abuse had a significantly higher prevalence of being diagnosed with aggressive conduct and attention-deficit disorders than those without a

substance-or alcohol-use disorder. The different findings, however, could be attributed to the different composition of the samples. Milin et al.'s (1991) sample was predominately male.

On balance, these findings suggest that the type of co-occurring (internal, external, or both) disorder that a female juvenile offender manifests is likely to be related to her response to treatment and to her treatment outcomes. Given that the majority of girls with a substance use disorder in the sample evidenced both internalizing and externalizing disorders, practitioners working with female juvenile offenders must screen for co-occurring substance use and other mental-health disorders, and use treatment strategies that address problems related to both internalizing and externalizing disorders. These findings warrant the use of interventions and treatment strategies that address cognitive and emotional processes as well as behavior.

Female Juvenile Offenders With and Without a Substance Use Disorder

The second aim of the study was to determine if the psychosocial profiles of those with and those without a substance use disorder differ, as measured by the MAAS. Results of the profile analysis revealed that there were similarities between the two groups on 10 domains of the MAAS: depression, self-esteem, problems with mother, problems with father, problems with school, family problems, suicide, guilt, and disturbing thoughts. However, the two groups differed on six domains of the MAAS: personal stress, aggression, memory loss, confused thinking, substance use, and alcohol use. Girls with a substance use disorder had significantly more problems in these domains of psychosocial functioning.

Not surprisingly, girls with an alcohol- or substance-related disorder exhibited higher levels of problem severity related to alcohol use and substance use than girls without a substance use disorder. Because the abuse of psychoactive substances impairs short-term memory, attention, judgment, and other cognitive functions (McNeece & DiNitto, 2005), these factors may explain why girls with a substance use disorder, as compared to girls without a substance use disorder, had significantly higher mean scores on the subscales of memory loss (e.g., *there are times when I forget my name; I have difficulty remembering things that I should easily remember; and I forget important things about my work or school*) and confused thinking (e.g., *I have difficulty my thoughts straight; there are times when my mind plays tricks on me; and I worry about the way my mind seems strange*).

Research demonstrates that girls with a substance use disorder exhibit deficits in executive cognitive functioning (Mezzich et al., 1997), a higher order cognitive construct involved in the regulation of thoughts, actions, and goal-directed behavior through planning, abstract reasoning, impulse control, hypothesis generation, and problem solving (Tremblay, 2003). Impaired executive cognitive functioning has been hypothesized to compromise the ability to generate alternative socially adaptive behavioral responses in challenging situations, permitting negative affective states and other maladaptive responses (e.g., drug abuse, aggression) to dominate (Fishbein, Hyde, Coe, & Paschall, 2004). In addition, deficits in executive cognitive functioning have been found to be associated with high levels of aggression in populations of girls with a substance use disorder (Giancola & Mezzich, 2000). Other studies have found that relative to other antisocial behaviors, aggressive behavior is more strongly linked to substance use (Moss

& Kirisci, 1995; Rey et al., 2002). One reason for this could be that behavioral disorders stemming from substance abuse contribute to the impairment of cognitive functioning beyond existing cognitive deficits (NIDA, 2003). A second reason could be that substance abuse exacerbates the cognitive and emotional processing styles (i.e., hypervigilance, hostile attributional biases, and aggressive response patterns) that promote or lead to aggressive behavior (Dodge & Pettit, 2003). These findings and hypotheses suggest that the executive functioning of female juvenile offenders may be substantially more impaired than their counterparts without a substance use disorder.

Although girls with a substance use disorder had significantly higher mean scores on the aggression subscale compared to girls without a substance use disorder, both groups had scores in the clinical range (<15). Because conduct disorders and delinquency are also related to deficits in executive cognitive functioning (Moffitt & Henry, 1989) or impaired social-information processing (i.e., cognitive and emotional processes underlying social interactions) abilities, one could surmise that impaired executive functioning or deficits in social information processing may be a contributing factor to aggressive behavior among nonsubstance abusing girls in the sample as well.

Aggressive behavior in both groups could be attributed to a life experience of physical or sexual abuse, which is prevalent in populations of incarcerated adolescent females. From the perspective of the biopsychosocial model of conduct disorder, the life experience of abuse, which is a major distal risk factor for aggressive behavior, leads to the acquisition of social-information processing patterns that include hypervigilance, attribution bias toward hostile intent, and rapid accessing of aggressive responses during

problematic social situations (Dodge & Petit, 2003). These acquired processing patterns hinder the ability to regulate emotions, which, in turn, lead to aggressive behavior.

Findings of the profile analysis also revealed that girls with an alcohol- or substance use disorder exhibited significantly more problems in the area of personal stress. Psychosocial stress, particularly high levels, has been found to contribute to the dysregulation of executive cognitive functioning (Koenen et al., 2002), indicating further that the cognitive functioning of girls with a substance use disorder may be more impaired than that of girls without a substance use disorder.

Implications for Practice

In short, these findings suggest that all girls in the sample would benefit from psychoeducational interventions and social-skills training, based on cognitive-behavioral approaches that promote and teach problem solving skills, conflict resolution strategies, and anger management strategies. Cognitive-behavioral approaches have been shown to be consistently effective with juvenile offenders. Lipsey, Wilson and Cothorn (2000) conducted a systematic review on effective interventions for institutionalized and noninstitutionalized adjudicated youths. Their findings revealed that interventions for incarcerated youths that incorporated interpersonal skills training such as social skills, aggression replacement, or cognitive restructuring were particularly effective in reducing recidivism.

The girls in the sample with a substance use disorder, however, may benefit from more intense interventions that focus on cognitive restructuring or cognitive recovery, and that promote coping and stress management skills as well. Interventions focusing on improving or restoring cognitive functioning among girls with a substance use disorder

may be required, particularly in light of findings from other studies demonstrating that substance-abusing individuals with cognitive impairments may not respond to interventions or treatment modalities that require sustained attention and those that emphasize goal setting, planning, and problem solving (Aharonovich, Nunes, & Hasin, 2003; Fishbein et al., 2004), which are essential features of cognitive behavioral approaches. Nevertheless, practitioners working with female juvenile offenders should assess the cognitive functioning of all girls, irrespective of a girl meeting criteria for a substance use disorder, and adapt treatment strategies that coincide with each girl's cognitive abilities (Bonta, 1996; NIDA, 2003).

Distinct Psychosocial Risk Profiles

The final aim of the study was to determine if there were distinct psychosocial risk profiles in the sample. A range of psychosocial subscales covering family, peer and school processes, psychopathology, and antisocial outcomes were selected for examination based on the biopsychosocial model of conduct disorder/antisocial development. On the basis of this model, successful interventions require addressing multiple risk factors and multiple outcomes at the same time, which, in turn, will require multicomponent interventions (Dodge & Pettit, 2003). The model further posits that because development operates through psychological processes and life experiences with parents, peers, and school, it is these domains that interventions should address. Of the 11 subscales, three measured family processes (i.e., family management and parenting practices, family relationships, and problems with mother); two measured school processes (i.e., attachment/bonding to school and cognitive abilities/academic underachievement); two measured peer processes (i.e., peer acceptance/peer rejection and

association with deviant peers); three measured antisocial outcomes (i.e., aggression, alcohol use, and substance use), and one measured internalizing problems (i.e., depression).

Given that one of the implications of the biopsychosocial model is that interventions must be culturally, racially, and developmentally sensitive, the variable of race was selected as a demographic covariate. In addition, race is considered to be a factor that may influence treatment responsivity and treatment outcomes (Young & Harrison, 2001; Bonta, 1996). History of substance use is also considered to be a factor that may influence treatment outcomes (Catalano et al., 1990). Accordingly, the variable of *DSM-IV-TR* alcohol- or substance use disorder was selected as a background covariate.

Overview of Latent Classes

Results of the latent class analysis revealed four subgroups of female juvenile offenders with distinct psychosocial risk profiles: Aggression Only, Aggression and Drug Use, Severe Alcohol and Drug Use, and Family Conflict. Three of the four psychosocial risk profiles closely resemble the three profiles (Justice Involved, Comorbid Substance Use, and Heavy Substance Use) of a mix gender sample of substance-abusing adolescents identified in a previous study conducted by Rowe et al. (2004). These profiles are discussed below.

Half of the sample in the present study was in the Aggression Only class (the largest class). Girls in this class displayed low to moderate psychosocial problems. The only clinically elevated or high risk score in this class was on the subscale of aggression. Compared to the other classes, girls in this class had the highest psychosocial functioning and the lowest level of problem severity. However, they had one of the highest rates of

having a prior incarceration, having a prior offense of a violent felony, and meeting criteria for a conduct disorder. The psychosocial risk profile of girls in this class is consistent with that of the adolescents in the Justice Involved group identified in Rowe, et al.'s (2004) study. Adolescents in this group exhibited few individual and family risk factors, and reported few problems related to alcohol and drug use, but had elevated legal involvement. The characteristics of girls in the Aggression Only class appear to be consistent with traits that are conducive to an adolescence-limited developmental pathway of antisocial behavior (i.e., antisocial or delinquent behavior that appears for the first time in adolescence and that does not persist into adulthood) identified by Moffitt (1993).

Similar to girls in the Aggression Only class, girls in the Family Conflict class reported relatively low problems related to alcohol and substance use, and high problems related to aggression. Girls in this class had problems with their mother, family relationship problems, and problems related to depression and school. Their rates of having a prior incarceration and having a prior violent felony offense were similar to the rates of girls in the Aggression Only class. Some of the characteristics of girls in this class overlap with the characteristics of adolescents in the Comorbid Substance Abuse group identified in Rowe et al.'s (2004) study. Individuals in the Comorbid Substance Abuse group reported relatively low substance use and psychological problems with drugs and elevated problems related to family conflict.

Girls in the Aggression and Drug Use class, while similar to girls in the Family Conflict class in terms of having problems related to aggression, depression and school, had relatively few family-related problems. They did, however, have elevated problems

related to alcohol use, drug use, and deviant peer association. All girls in this class met criteria for an alcohol or substance use disorder, and they had the second highest prevalence rate of meeting *DSM-IV-TR* criteria for an alcohol and polysubstance disorder.

Similarly, all the girls in the Severe Alcohol and Drug Use class (the smallest class) had an alcohol- or substance use disorder and had elevated problems related to alcohol use and drug use. Their level of problem severity, however, was much higher than girls in the Aggression and Drug Use class. Their level of problem severity related to aggression was also extremely high. Girls in this class had clinically elevated or high-risk scores on 10 of the 11 measured subscales. This is reflective of increasing psychosocial problems being associated with more severe alcohol and substance related problems. Girls in this class had the highest rates of having a first court referral at the age of 12 or under, and having three or more prior adjudications.

The psychosocial profile of girls in this class is consistent with the characteristics of the Heavy Substance Use group identified in Rowe et al's (2004) study. High levels of problem severity related to substance use and high levels of involvement with antisocial peers—particularly substance-using peers—characterized adolescents in this group. The psychosocial profile of girls in the Severe Alcohol and Drug Use group appears to coincide with the characteristics of the delayed-onset pathway of antisocial behavior proposed by Silverthorn and Frick (1999). In this pathway, “girls are hypothesized to share many of the vulnerabilities of the early onset boys [i.e., Moffit's (1993) description of childhood-onset/ life-course persistent offenders] but do not manifest severe antisocial behavior until adolescence when there are significant changes in girl's biological and social milieu” (Silverthorn & Frick, 1999, p. 122). These characteristics include

cognitive/neurological dysfunction, negative family histories, problematic family relationships, dysfunctional parenting practices, substance abuse and marked aggression (Silverthorn & Frick, 1999). Given their psychosocial profile, girls in this class are more likely to persist with antisocial behavior into adulthood.

Similarities and Further Characterization of Latent Classes

There were similarities across all classes. Across all classes, girls had clinically elevated scores on the subscale of aggression, indicating that aggression is a problem among all girls in the sample. This finding was also borne out by the profile analysis conducted in the current study. Additionally, across all classes, the mean scores on the subscale of problems with friends (e.g., peer acceptance/rejection) were in the subclinical range, indicating that girls in the sample reported minimal problems related to peer rejection. Conversely, scores on the domain of peer relationships (i.e., association with deviant peers) were in the moderate- and high-risk categories. These findings are consistent with the conceptualization and evidence that the relationships of antisocial adolescents are not always characterized by low bonding or low attachment, but are usually characterized by high bonds and attachments to antisocial or deviant peers (Ayers et al., 1999; Catalano & Kosterman, 1996; Gilmore, et al., 1992).

Descriptive analyses also revealed other similarities across classes. For example, there were similarities across classes in the rates of meeting criteria for specific mental health disorders, including mood disorder, anxiety disorder, attention deficit hyperactivity disorder, oppositional defiant disorder, and learning disorder. In general, the rates of meeting criteria for these disorders appeared to be evenly distributed across classes. Although there was not a significant difference across classes in the rates of meeting criteria for a mood disorder, the level of problem severity associated with depression was

not uniformly distributed across classes. For example, girls in the Aggression Only class (the largest class) had scores in the subclinical range on this measure, whereas girls in the other three classes had scores in the clinically elevated range. Most likely these different findings resulted from the fact that the MAAS depression subscale measured global symptoms of depression, whereas specific depressive disorders such as major depression, dysthymia or bipolar disorder, each characterized by a unique set of symptoms, were grouped under the category of mood disorders.

Covariates of Race and DSM-IV-TR Diagnosis of an Alcohol or Substance use Disorder

The examination of the covariate of race revealed that race did not influence latent class membership. This finding could be attributed to the disproportionate number of African American girls in the present sample or it may be that there was not much racial variation among the sample on the combination of variables examined in the present study. Despite this finding it is important for practitioners to ensure that treatment and interventions are culturally appropriate for all girls. Conversely, the covariate of *DSM-IV-TR* diagnosis of an alcohol or substance related disorder did predict latent membership. The majority of the girls in the sample, whether with or without a substance use disorder, were in the Aggression Only class followed by the Family Conflict class. And, all girls in the Aggression and Drug Use and Severe Alcohol and Drug Use classes had an alcohol or substance use disorder.

Despite the moderate to high prevalence of girls in the Aggression Only and Family Conflict classes with a substance use disorder, girls in these respective classes reported relatively low problems related to alcohol use or drug use. Similar results were found in another study conducted with clinically referred adolescent substance abusers

(Rowe et al., 2004). A study conducted with samples of adult female offenders found that a substantial proportion of female offenders did not report or acknowledge consequences or problems associated with elevated substance or alcohol use (Phillips, Nixon, & Pfefferbaum, 2002).

Self-reporting bias may be one reason for the current finding. Some of the girls in the sample may not have reported problems related to their alcohol or substance use honestly or accurately. Second, because abuse and dependence were grouped under the category of alcohol or substance use disorder, and the symptoms of alcohol or substance abuse are less severe than alcohol or substance dependence (Clark, 2004), girls with a diagnosis of abuse may have been overrepresented in the Aggression Only and Family Conflict classes, whereas girls with a diagnosis of dependence may have been over represented in the Aggression and Drug Use and Severe Alcohol and Drug Use classes. Third, the finding could also be attributed to the limitation of the *DSM-IV* to adequately capture the heterogeneity that exists among girls in the current sample with an alcohol- or substance use disorder. This assertion is made because “some *DSM-IV* symptoms may have low specificity for adolescents—that is, their presence does not clearly distinguish among adolescents with different levels of drinking or substance using problems” (Martin & Winters, p. 98, 1998).

Implications for Female Juvenile Correctional Programming

The variation in psychosocial risk profiles across classes indicates heterogeneity within the sample and suggests to policymakers, intervention researchers, and practitioners that the needs of female juvenile offenders may not be met optimally by using fixed intervention strategies based on a single uniform composition and dosage

(Collins, Murphy, & Bierman, 2004). There may be a need to adopt adaptive treatment strategies that tailor the treatment components, treatment composition and dosage to the needs of each group (Murphy, & McKay, 2003) or client matching strategies that match an individual to a particular treatment program, treatment modality or set of interventions based on the characteristics and treatment needs of the individual. Meta-analytic studies have shown that interventions or programs based on client-treatment matching strategies were more effective in reducing recidivism among juvenile and adult offenders than those programs that did not use these strategies (Dowden & Andrews, 1999a; Dowden & Andrews, 1999b). By adopting adaptive treatment or client matching strategies correctional administrators and practitioners can make better use of available resources by distributing interventions among juvenile offenders on the basis of the needs and characteristics of the offenders (Murphy, & McKay, 2003). These strategies may also reduce iatrogenic effects and increase treatment response (Collins, Murphy & Bierman, 2004).

The current findings indicate that the level, dosage and type of interventions provided to subgroups of female juvenile offenders should be tailored to their psychosocial risk profiles. For example, girls in the Aggression and Drug Use and Severe Alcohol and Drug Use classes may benefit from highly structured, intensive substance abuse treatment, such as that provided within an in-custody therapeutic community. Girls in both groups would also benefit from intensive cognitive behavioral therapy that focuses on stress and anger management, problem solving, and relapse prevention therapy based on cognitive behavior principles such as self-monitoring to recognize drug cravings and to identify high-risk situations for use, and strategies for refusing drugs,

coping with and avoiding high-risk situations and the desire to use, resisting peer pressure to use drugs (Carroll & Keller, 1991). They would also benefit from cognitive behavioral approaches that address problems related to depression. Approaches that have been found to be effective in reducing depressive symptoms and improving social functioning among a sample of juvenile justice involved youths include those that focus on monitoring moods, improving social skills, increasing pleasant activities, decreasing anxiety, reducing depressogenic cognitions, and improving communication and conflict resolution (Rohde, et. al, 2004).

Girls in the Severe Alcohol and Drug Use class, however, may require more extensive treatment (i.e., beyond the period of 6 months) than girls in the Aggression and Drug Use class because of their extremely high clinically elevated problems related to alcohol and drug use and their high rates and levels of problem severity related to other psychosocial factors. Because of the possible deficits in cognitive functioning observed in girls in this class, they may need to be assessed periodically to determine their readiness or ability to learn the cognitive skills necessary to benefit from cognitive-behavioral interventions and approaches. They would also benefit from remedial educational classes, which are an essential element of therapeutic communities (Winters, Latimer, & Stinchfield, 2000).

Conversely, because girls in the Aggression Only and Family Conflict classes reported subclinical problems related to alcohol and substance use, girls with a substance use disorder in these respective classes would probably benefit from substance abuse treatment that is less intensive than that provided within a therapeutic community. Substance abuse treatment in the form of individual or group counseling may be more

optimal for girls in the Aggression Only class, whereas family-based substance abuse treatment may be more optimal for girls in the Family Conflict class. Moreover, because many incarcerated girls have a high likelihood of developing substance use problems in adulthood (Lanctôt, Cernkovich, & Giordano, 2006; Lewis et al., 1991; Storm-Mathisen & Vaglum, 1994; Zocolilo & Rogers, 1991), girls without a substance use disorder in the Aggression Only and Family Conflict classes would benefit from psychoeducational group interventions modeled after prevention education strategies. These strategies include providing information about drugs and alcohol, exploring expectancies and consequences of alcohol and substance use, and providing skills-based training related to drug-refusal skills.

Similar to girls in the Aggression and Drug Use and Severe Alcohol and Drug Use classes, girls in the Family Conflict class would benefit from interventions targeting their depression. And, given their family problems, girls in the Family Conflict class, as well as girls in the Severe Alcohol and Drug Use class, would benefit from intensive family-based interventions. Although most of the empirically supported family-based interventions treatments for juvenile offenders, such as Multisystemic Therapy, Multidimensional Treatment Foster Care or Parent Management Training, are almost exclusively community-based, some of the techniques and approaches used in these empirically supported community-based interventions could be used in correctional residential settings. Some of those approaches or techniques include providing family counseling, targeting parent-child interactions, reframing problem behavior, role playing, modeling behavior, teaching parents how to communicate and problem solve more effectively, and training parents to positively reinforce their child's prosocial behavior. In particular, parents of girls in the Severe Alcohol and Drug Use class may benefit from

interventions that teach them how to more effectively monitor and supervise their daughter.

Despite the heterogeneity across classes, there were some common problems among the girls in the sample. There were common problems related to aggression, delinquency, and association with deviant peers (with the latter ranging from moderate- to high-risk), indicating that all girls in the sample would benefit from a core set of cognitive behavioral interventions that incorporate social skills training, behavioral management, and self-regulation skills to increase their social and cognitive skills and decrease their aggressive and delinquent behavior and their association with deviant peers.

Implications for Aftercare Services

The findings of the present study also have implications for the provision of aftercare services to female juvenile offenders. Although it is unknown as to what types of aftercare services are needed for what types of offenders (Altschuler & Armstrong, 2002), incorporating aftercare services that specifically target the psychosocial profiles of subtypes of female juvenile offenders may maintain or enhance treatment gains made during incarceration. For example, girls in the Family Conflict class would benefit from aftercare services based on the treatment model of multisystemic therapy or multidimensional treatment foster care (MTFC). These family-based treatment models, as described in chapter 2 have strong empirical support. MTFC should be an option for girls in this class who cannot or may not be able to return immediately to their family after leaving the juvenile correctional facility, but who will eventually return home to their family.

Girls in the Aggression and Drug Use class would benefit from aftercare services based on the treatment model of multisystemic therapy as well. However, given their substance and alcohol related problems, they may require more intensive and extensive MST services (i.e., higher frequency of sessions and longer duration of services) than girls in the Family Conflict class. Given that girls in the Aggression Only class had the highest level of psychosocial functioning, and lowest level of problem severity it may be more cost effective and optimal for girls in this class to receive less intensive services or to receive brief aftercare services in the form of interpersonal skill training, behavioral contracting, or individualized counseling that is cognitive-behavioral oriented. These interventions have been shown to be effective in reducing recidivism among noninstitutionalized juvenile offenders (Lipsey, Wilson, & Cothorn, 2000).

Conversely, girls in the Severe Alcohol and Drug Use Class, the class with the most severe problems, would require the most intensive and extensive aftercare services. Girls in this class would benefit from an aftercare community-based substance abuse residential treatment program. In order to maintain continuity of care for girls in this class, the program should be based on a therapeutic-community modality. Girls in this class would also benefit from booster sessions as well as individual and family-based substance abuse treatment.

Summary

Overall, the findings of the latent profile analysis add to the body of evidence demonstrating that many problem behaviors among juvenile offenders co-occur (Ellickson, Saner, & McGuigan, 1997; Huizinga, Loeber, Thornberry, & Cothorn, 2000; Rowe et al., 2004). The findings, however, show that the configuration of problems and the level of problem severity differ across subgroups of female juvenile offenders,

warranting the need for varying levels of treatment intensity and different treatment components across subgroups.

Conclusion

The present study provides evidence that serious female juvenile offenders are a heterogeneous group in terms of their psychosocial risk profiles. For example, serious female juvenile offenders with and without a substance use disorder differ in terms of their psychosocial risk profiles; female juvenile offenders with a substance use disorder evidenced higher levels of problem severity, requiring differing levels and types of interventions. Moreover, beyond differences between those with and those without a substance use disorder, the psychosocial risk profiles of serious female juvenile offenders with a substance use disorder varied, suggesting that it may be necessary to provide interventions to female juvenile offenders with a substance use disorder that range from less to more extensive. Accordingly, the developers of interventions, programs, and policy cannot presume that similar approaches to addressing and treating delinquency, substance abuse, and other problem behaviors in girls are warranted. Policies, interventions and treatment strategies should be developed to address the heterogeneous needs of female juvenile offenders.

Limitations of Present Study and Future Research

Several limitations of the present study should be noted. First, the size of the sample was relatively small, and the majority of the measures used in the present study were based on self-report data. Future research would benefit from the use of larger sample sizes, and the use of multi-informant measures. Second, the findings of the present study were drawn from one site. As such, the findings are state-specific and may

not generalize to samples or populations of girls incarcerated in other states. Thus, this study needs to be replicated using samples of incarcerated juvenile females in different states. Third, histories of victimization or trauma were not examined in the present study because of unreliable measures. Given that histories of victimization and trauma are common in the lives of incarcerated girls, variables measuring victimization or trauma should be included in future studies using latent class analysis. These variables are likely to influence the latent class membership to which a particular girl may belong. Fourth, the present study was cross-sectional. This did not allow for understanding the underlying mechanisms and processes that contribute to substance abuse and delinquency among girls. Furthermore, given the cross-sectional nature of the current study, only pretreatment characteristics of the sample were examined. Future research is needed that examines the treatment outcomes and posttreatment trajectories of girls with different psychosocial risk profiles.

Implications for Practice

Despite these limitations, several implications (in addition to those noted above) for social-work practice can be made. First, it is critical that practitioners in juvenile justice settings screen and assess all adolescents for substance use and other mental-health problems. Moreover, it is important for practitioners working with female juvenile offenders to be skilled in addressing co-morbid substance use disorders, and to use treatment strategies that address internalizing, externalizing, and combined internalizing and externalizing disorders. Second, given the array of psychosocial risk factors that accompany delinquency and substance abuse, such as maladaptive family functioning, low parental supervision, parental conflict, deviant-peer association, academic difficulty,

and low bonding/attachment to school, it is important for practitioners to intervene in these areas as well. Accordingly, practitioners should conduct comprehensive assessments that cover multiple domains of psychosocial functioning, particularly domains related to family, peer, and school processes. Finally, practitioners must consider the combination of problems and the level of problem severity exhibited by female juvenile offenders in order to match, link, and provide appropriate services and treatment dosage to the varied needs of girls in this population. All female juvenile offenders, however, should be provided with a core set of cognitive behavioral interventions that incorporate social skills training, behavioral management, and self-regulation skills.

Strengths of Current Study

The present study also had strengths. One of the strengths is that the variables selected for inclusion in the major analyses were guided by a theoretical model. Second, the present study extends previous research on delinquency and substance abuse in population of female juvenile offenders by examining the heterogeneity that exists in this population instead of focusing on differences between female and male juvenile offenders. Third, the study provides information that is useful in understanding the patterns of substance related and mental health disorders of incarcerated girls. Finally, a major strength is that the methods used in the present study could aid the North Carolina Department of Juvenile Justice and Delinquency Prevention in tailoring interventions, based on empirically based classification schemes, for girls committed to Samarkand Youth Development Center.

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